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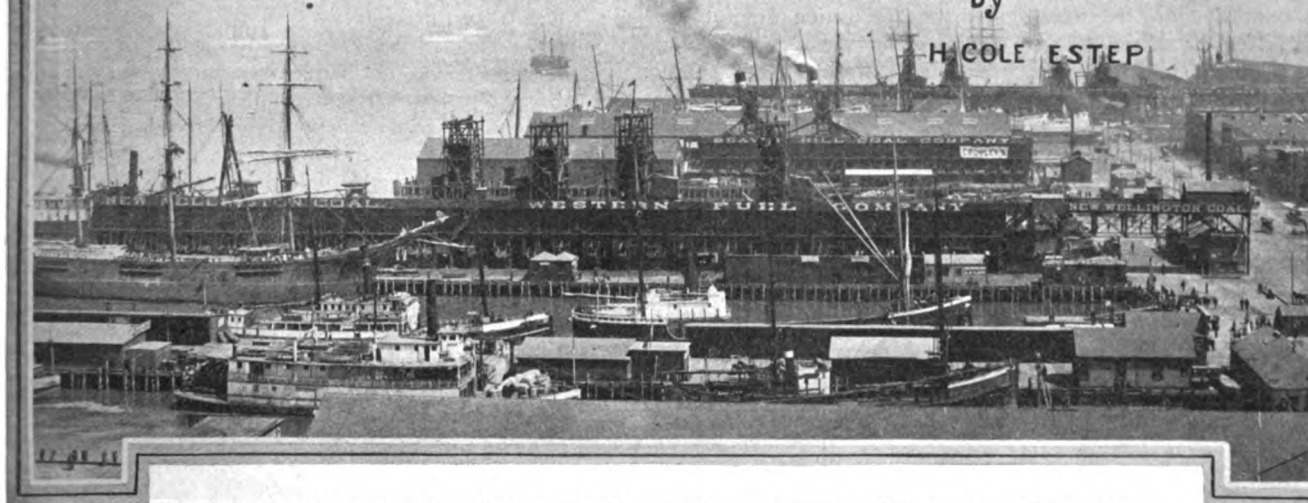
NEW YORK

No. 2

The Harbor of San Francisco

by

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GENERAL VIEW OF THE WHARVES OF SAN FRANCISCO LOOKING SOUTH FROM FERRY DEPOT.

IF an accurate chart of the Pacific coast of North America, showing in detail the bays and harbors, had been placed in the hands of an intelligent Englishman in 1750, with the injunction to pick out the probable location of the principal seaport towns, which would be created when America became populated, there is no doubt but that he would have at once selected San Francisco Bay, the Columbia River and Puget

Fourth of a series of articles describing the principal harbors of the Pacific coast. Other articles have been published as follows: Portland, Ore., May, 1909. Seattle, Wash., July, 1909; Victoria and Vancouver, B. C., October, 1909. One more article will be published, Tacoma, Wash., probably in March, 1910.

Sound as the location of the three principal commercial cities of the Pacific coast. The principal features of the harbors of the Columbia river and Puget Sound have been previously set forth in these pages. It now remains to discuss the harbor, which has called the city of San Francisco into being.

San Francisco harbor is distinguished by being the scene of the most concentrated population to be found on the Pacific coast—over 700,000 people live on San Francisco Bay within an area not exceeding 50 square miles—and by being nearer the ocean than any other Pacific coast harbor. Dense population,

proximity to the sea and unusual natural endowments have combined to make San Francisco harbor notable among the commercial ports of the world. As a result, harbor facilities, wharves, warehouses, freight transfer terminals, fuel bunkers, dry docks and ship building plants, in number and capacity exceeding those of any other single Pacific coast city, have been constructed. But these are not the most important features of the harbor. The single feature, which is most noteworthy and which other ports can study with most profit, is found in the fact that San Francisco has enjoyed the advantages of the ad-

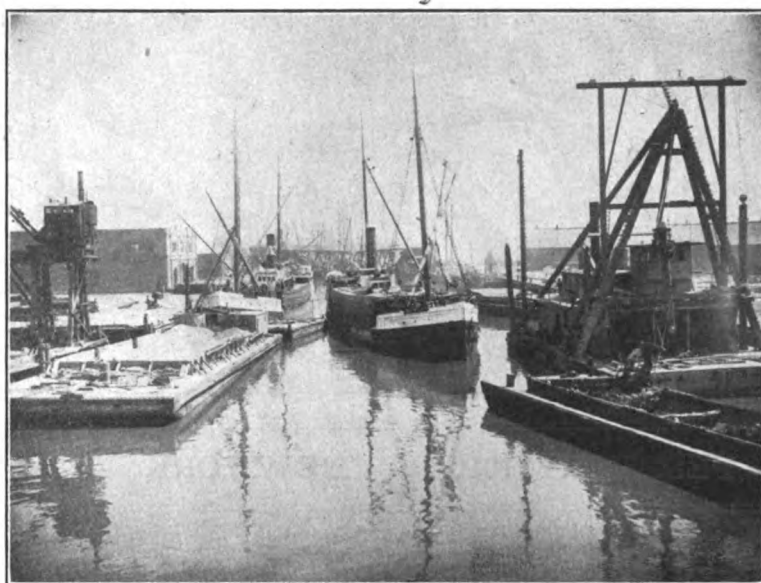


FIG. 1—LUMBER WHARVES FOR COASTING VESSELS ON CHANNEL STREET.

ministration of a permanent harbor commission, endowed with sufficient authority to direct the symmetrical development of the port facilities, since the year 1863. It is true that the administration of the early harbor boards was crude and faulty and that some regimes in the early days have not left records savoring to any notable degree of honesty or freedom from political taint, but nevertheless the beneficial effects of unified port administration are everywhere visible. Of late years the administration of the harbor boards has been unusually capable and efficient. It has been said that the development of a great commercial port on San Francisco Bay has made the work of the State Board of Harbor Commissioners possible, but it is nearer the truth to say that the work of the Board of Harbor Commissioners has been an essential factor in the commercial success of San Francisco.

In a previous article in this series the writer enumerated the six requisites for a good harbor as follows: (1) protection from storms, (2) ample depth and good anchorage, (3) size, (4) accessibility, (5) sufficient shore line for the construction of the necessary docks and wharves, and (6) facilities for handling freight and for the repair of vessels.

The Golden Gate.

San Francisco Bay is connected with the ocean by a channel known the world over as the Golden Gate. It is only three miles in length and nearly a mile wide at its narrowest point. It has an average depth of $5\frac{1}{2}$ fathoms, a maximum depth of 60 fathoms and a commodious channel with a minimum depth of 9 fathoms. The shores of the Golden Gate are high, bold and rocky. Outside the entrance and about six miles distant is the bar, on which there is a

depth of at least 33 ft. at low tide. There is also another channel of approach to the Gate, known as the North or Bonita channel, which is one-third of a mile in width and has a minimum depth of 54 ft. Ships of maximum draught can enter San Francisco harbor at all times with safety.

San Francisco harbor offers ample protection from the storms which rage on the Pacific Ocean in winter. The entrance to the harbor is not quite a mile wide at its narrowest part, while inside two islands are placed so as to effectively prevent any storms or heavy ocean swells from entering the bay. The bay itself, however, is over four miles in width and 37 miles in length, practically unobstructed. This gives plenty of opportunity for the wind to create seas which are severe enough to make

the bay untenable for small open boats, but which have no effect on large vessels. Occasionally during severe storms and on account of the unobstructed sweep of the wind inside the harbor, vessels have dragged their anchors, fouled against one another and drifted into precarious positions. In general however, the anchorages are absolutely safe and the protection from storms is complete. The hills to the west, between the bay and the sea, have an average height of over 350 feet and a maximum elevation of 2,604 ft.

Size of the Harbor.

The waters of the entire Bay of San Francisco cover an area of over 250 square miles, 24 square miles of which are in the immediate vicinity of the city and are now used as anchorage ground, exclusive of fairways, which occupy seven square miles. In addition, there are available for anchorage in San Francisco Bay proper over 40 square miles, while in the adjoining extensions, known as San Pablo and Suisun bays, there are over 20 square miles of additional anchorage ground, making a total of some 100 square miles with depths ranging from 18 to 60 ft. at low tide. The bottom is blue and yellow mud with shells, making an excellent holding ground.

San Francisco Bay, with San Pablo Bay, its northern extension, covers an area of 420 square miles. The shore line of San Francisco Bay alone, leaving out of consideration for the time its numerous navigable inlets, measures 100 miles in length. From the southern portal of the Golden Gate at Fort Point, along the bay shore of San Francisco and San Mateo counties to Ravenswood Point, thence across the Narrows and

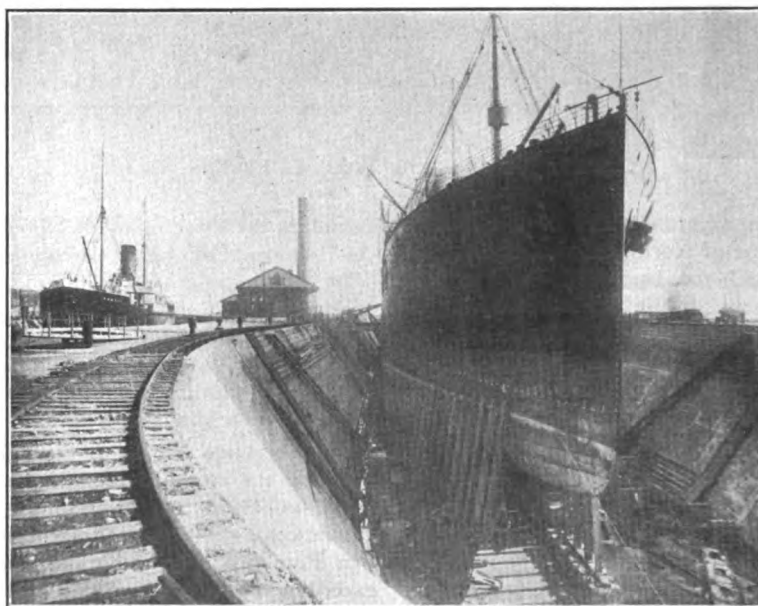


FIG. 2—HUNTER'S POINT DRY DOCK, OPERATED BY UNION IRON WORKS.

along the shores of Alameda, Contra Costa and Marin counties to Lime Point on the north shore of the Golden Gate, every mile is suitable and available for commercial and industrial purposes. The city of San Francisco, situated on the

per hour. The average current in the Gate is about 2 knots per hour.

Improvements to the Bay of San Francisco, made by the United States Government in the interests of navigation and commerce, include the removal from

Carquinez Strait with Suisun Bay, which is 10 miles long and from 5 to 6 miles wide. Into the head of Suisun Bay empty the two largest rivers in California, the Sacramento and the San Joaquin.

Through San Pablo Bay there is a navigable channel dredged 23½ ft. deep and 300 ft. wide. The channel is marked by nine black buoys and connects deep water in the southern end of San Pablo Bay with deep water in Carquinez Strait. This channel is used by all deep water vessels approaching Suisun Bay or Mare Island Navy Yard. Silt brought down by the rivers makes constant dredging necessary to keep this channel clear.

Through Carquinez Strait the channel has a minimum width of half a mile and a depth of from 7 to 14 fathoms. In Suisun Bay the channel has a least navigable depth of 13 ft. at low tide.

The Sacramento river is navigable throughout the year to Red Bluff, a distance of 262 miles, and the San Joaquin is always navigable to Stockton, about 40 miles above its mouth and occasionally to Fireboughs, 100 miles further up the river.

In San Francisco proper, the area, in which wharves may be built, is limited in length by that of the shore line of the bay in the county (about 10 miles), and in width by the distance between the established harbor lines, known respectively as the bulkhead or sea-wall line and the pierhead line. These lines were recommended by the state harbor commissions and received the final approval of the War Department. The bulkhead line is the one to which solid filling from the shore is permitted and on which about two miles of sea-wall has been constructed. Its general loca-

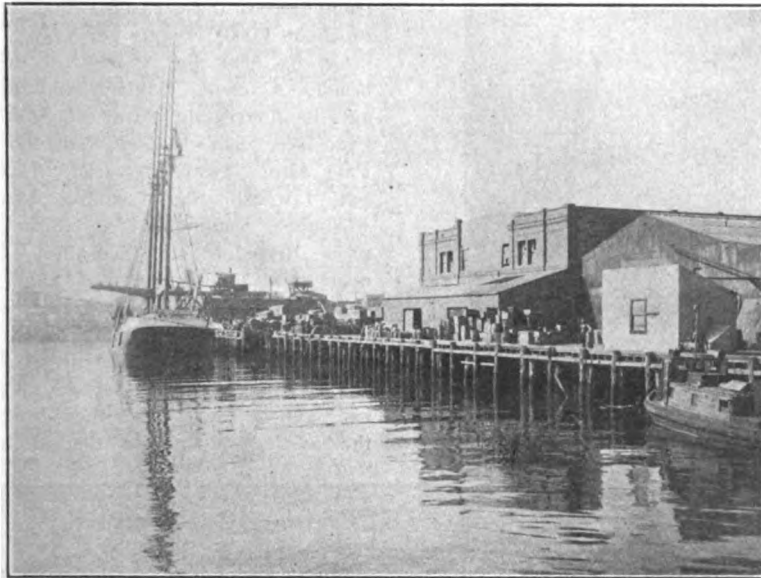


FIG. 3—CHANNEL STREET, OUTER WHARVES.

peninsula on the south side of the entrance to the bay, has within its city and county limits a water frontage on the bay about 10 miles in length from the Presidio to the San Mateo County. If the measurements be made along the shore line to include the channels and basins, South Basin, India Basin, Islais Creek, Central Basin and Channel street, the water front has an aggregate length of 13 miles.

The total available water front of 100 miles in San Francisco Bay alone, no point of which is more than an hour's ride from the center of the city by local steamer, is ample for the needs of the present century. When this shore line is occupied, there will be yet available in San Pablo and Suisun bays over 50 miles of shore line that can be used without extensive dredging. A comparatively moderate sum spent for dredging in San Pablo Bay would add another 50 miles to the available shore lands, making a grand total inside the Golden Gate and so situated as to be of possible commercial service of over 200 miles.

Moderate Tidal Range.

The range of tides at San Francisco is very moderate, the average rise and fall being but 4.3 feet. Tidal currents in the Bay are not swift enough to be any menace to shipping. The currents in the Golden Gate, however, are sometimes severe. On ebb tides, with favorable wind, the currents in the Gate reach frequently a velocity of 5 knots

per hour. The entrance to the harbor of obstructions known as Blossom Rock, Shag Rock, Arch Rock and Rincon Rock, and the establishment of light and fog signals at the entrance and inside the harbor. Both the Bonita channel and the main ship channel are thoroughly buoyed. The entrance to the harbor is protected by fortifications of the most modern type. Estimates of the cost of removing two rocks known as Sears Rock and Centissima Rock on the east side of Bonita Channel and also of two small rocks inside the harbor near Mission Rock and known as Mis-

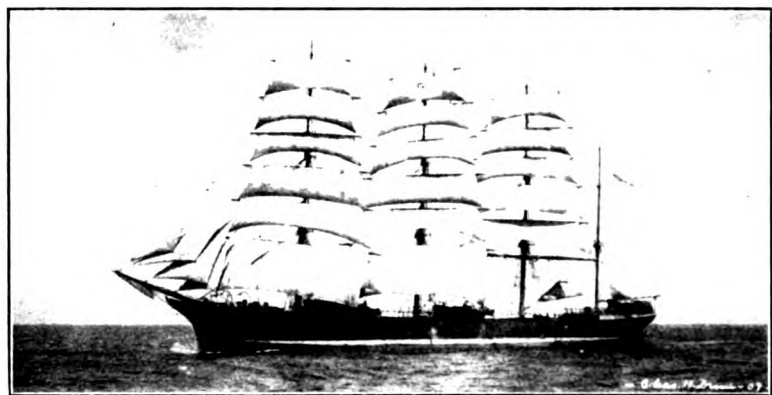


FIG. 4—"STAR OF SCOTLAND," ONE OF THE LAST OF THE AMERICAN CLIPPER SHIPS LEAVING THE GOLDEN GATE.

sion Bay Rock and Sonoma Rock, respectively, have been made.

San Pablo Bay, which is a continuation of San Francisco Bay to the north, is 14 miles in length and about 12 in width. It is in turn connected by Car-

quinez Strait with Suisun Bay, which is 10 miles long and from 5 to 6 miles wide. Between the bulkhead line and the high water or shore line, there was originally about 2,500 acres of submerged land, all of which was divided into city blocks and streets and sold



FIG. 5—SAILING VESSELS DOCKING AT SAN FRANCISCO.

more than thirty years ago by the State of California through its commissioners for the sale of Salt Marsh, Tide and Submerged Lands. Approximately 900 acres of this submerged area, most of it north of the Union Iron Works, has been reclaimed and is now some of the most valuable real estate in San Francisco. The other 1,600 acres, most of which lies south of the sugar refinery, in the vicinity of Islais Creek, India Basin, Hunter's Point and South Basin, has not been reclaimed. This submerged area might have been very useful for building wharves in enclosed basins, but having been disposed of by the State, it is now held at such a high valuation as to make it almost prohibitive for the State to acquire for harbor purposes. The pierhead line is reasonably parallel to and from 200 to 800 ft. outside the bulkhead line.

San Francisco is notable for the large

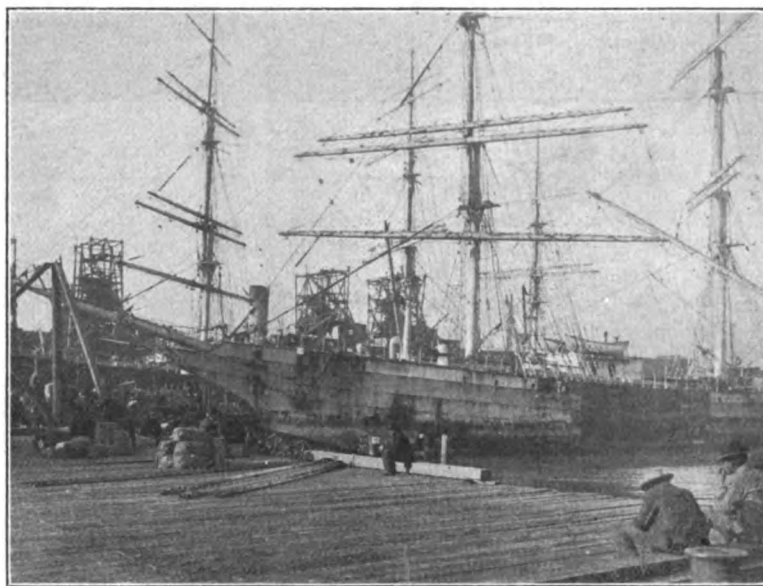


FIG. 6—COAL SHIPS UNLOADING CARCO INTO BUNKERS.

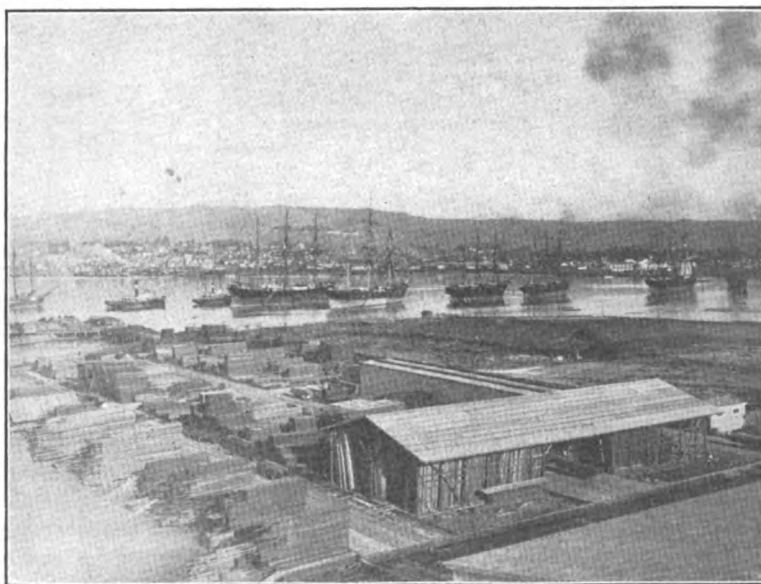


FIG. 7—OAKLAND HARBOR, SAN FRANCISCO BAY.

amount of deep water shipping that centers in the port compared with that originating on inland waters connecting with the bay. This is due to the fact that the only inland water routes of consequence tributary to the bay are the San Joaquin and Sacramento rivers. The commerce of these two streams amounts to about 1,000,000 tons per year.

On or near the shores of the bay, besides Alameda, Oakland and Berkley, are the flourishing towns of South San Francisco, San Mateo, Redwood City, Palo Alto, Newark, Alvarado, Hayward, San Lorenzo, San Leandro, Fruitvale, Piedmont, Richmond, San Rafael, Tiburon, Belvedere and Sausalito. On or near San Pablo Bay are San Pablo, Giant, Sobrante, Pinole, Rodes, Vallejo and Mare Island Navy Yard, while on the straits of Carquinez are Crockett, Eckley, Port Costa, Martinez and Benicia. These towns are either directly on the bays or connected thereto by the

smaller navigable rivers, sloughs and creeks and together furnish a local commerce amounting to 900,000 tons per year. The total commerce furnished by the inland waters of San Francisco Bay does not exceed 2,000,000 tons per annum.

Flourishing Deep Sea Commerce.

The city's deep sea commerce is very flourishing. The coastwise business with Los Angeles, San Diego, Point Arena, Fort Bragg, Eureka, Coquille River, Coos Bay, Columbia River, Puget Sound and Alaska is particularly heavy. The coastwise lumber trade amounted to 907,166,000 ft. board measure in 1908, which was a notably bad year for the lumber business. In the same year the fleet engaged in the lumber trade, which centers in San Francisco, consisted of 52 sailing schooners and 35 steam

schooners, with an aggregate capacity of 90,000,000 ft. B. M.

The foreign trade of San Francisco includes every port in the world, and this, coupled with the heavy coastwise traffic makes the total tonnage movement of the port very heavy. The State Board of Harbor Commissioners keeps a list giving the name and tonnage of every vessel that enters the harbor. Each vessel is credited with only one entry, although many of them make a large number of trips during the course of a year. From July 1, 1906, to July 30, 1908, two years, this list gives the names of 383 vessels, exclusive of bay and river steamers, which are 65 in number.

Table I, published herewith, shows in detail the tonnage movement of San Francisco for the fiscal year ending June 30, 1908, and a summary of the tonnage movement for each of the five years from 1902 to 1907. For the year

given time and a greater revenue derived from toll charges on merchandise reckoned by the ton. Efficiency of the labor employed in stevedoring and the convenient arrangement of the dock determine the rapidity with which cargo may be handled. Records have recently been established at San Francisco which compare favorably with those of European ports. The China steamers have recently discharged 6,000 and loaded 10,000 tons in ten days, or at a rate of 1,600 tons a day of eight working hours; that is, 200 tons per hour. The report of the Royal Commission of the Port of London, 1902, contains a record of observation of 58 vessels discharging a total of 244,764 tons in 3,908 working hours, or 62.6 tons per working hour; and the report states that the minimum and maximum rates were respectively 50 and 176 tons. At Montreal eight of the same vessels discharged at a rate of 52.2 tons per hour; while eight dis-

a comparison of the charges at San Francisco and at six European ports for similar cargoes of approximately five parts grain, three parts general merchandise and two parts lumber.

Wharves and Piers.

All the piers and cargo handling facilities in the harbor are the property of the state of California and are merely leased to their various tenants. There are in all 28 piers on the waterfront exclusive of ferry slips. The piers vary from 456 by 100 ft. in size to 820 by 124 ft. For a distance of 3,000 ft. on either side of Channel street are docks for handling lumber and heavy cargo. Channel street would be more properly called canal street and is navigable for moderate draught, medium size vessels.

The total dock room available for shipping, including the bulkhead wharves, amounts to 25,229 lineal ft. or 4.78 miles.

Union Ferry Depot.

At the foot of Market street is the famous San Francisco Ferry building. The building is a mammoth stone structure containing ticket offices, waiting rooms, baggage rooms, etc., for the various railroads centering in the city as well as the offices of the Harbor Commissioners and other public officials. Eight ferry slips connect with the building. Important additions to the Union Ferry Depot are in the course of construction for the use of the Western Pacific Railway Company, which will operate an extensive ferry service on San Francisco bay upon the completion of its railroad between San Francisco and Salt Lake. At several points along the water front are car ferry slips for the transfer of freight cars from points across the bay. Two new steel and concrete piers of latest construction, each 650 by 130 ft. in size, absolutely fire proof, are now under construction at the foot of First street. Complete details of these piers will be published in a subsequent article in THE MARINE REVIEW. In addition to these public landing facilities in the city of San Francisco, there are a large number of private docks and warehouses at other points on San Francisco Bay. Table III gives a list of the various warehouses in the vicinity of San Francisco.

Belt Railroad.

All the piers and wharves are provided with railway connections. The Harbor Commissioners have constructed and are operating a terminal railway in connection with the various piers owned by the state. This line is known as the Belt railroad and consists of four miles of main line and two miles of private spurs, connecting with the various trunk

TABLE I.
SAN FRANCISCO TONNAGE MOVEMENT FOR YEAR ENDING JUNE 30, 1908.

From	Steam.	Arrivals. Sail.	Total.	Steam.	Departures. Sail.	Total.
Coast	2,186,186	517,711	2,703,897	2,574,332	597,547	3,171,879
British Columbia	255,925	3,245	259,170	240,613	5,263	245,876
Hawaiian Islands	124,398	76,410	200,808	183,720	67,442	251,162
Alaska	17,540	44,327	61,867	13,076	42,655	55,731
Europe	96,836	36,191	133,027	79,800	1,796	81,595
Eastern Ports	99,355	14,418	113,773	8,469	5,060	13,529
Africa	2,777	.....	2,777	.....	.....	.....
China and Japan	351,907	3,156	355,063	315,097	17,276	332,373
South America	109,647	328	109,975	121,441	839	122,280
Philippines	63,711	.....	63,711	65,703	.....	65,703
Australia	194,907	87,390	282,297	55,035	32,296	87,331
Mexico	180,525	3,503	184,028	39,490	3,776	43,266
United Kingdom .....	.....	67,627	67,627	.....	60,832	60,832
Pacific Islands	17,451	1,674	19,125	20,297	2,101	22,398
Siberia .....	.....	.....	.....	3,020	542	3,562
India	2,592	.....	2,592	.....	.....	.....
Total	3,703,757	855,980	4,559,737	3,720,084	837,425	4,557,509
Year to June 30, 1907	3,141,152	1,217,496	4,358,648	3,107,017	1,212,671	4,319,688
Year to June 30, 1906	2,770,981	893,668	3,664,649	2,709,059	946,318	3,655,377
Year to June 30, 1904	2,421,059	803,432	3,224,491	2,391,084	832,089	3,223,173
Year to June 30, 1903	2,259,565	865,477	3,125,042	2,263,199	820,717	3,083,916
Year to June 30, 1902	2,190,405	968,739	3,159,144	2,151,249	945,673	3,096,922

From Annual Report of the Merchants Exchange.

ending June 30, 1909, the arrivals amounted to 4,707,238 tons and the departures to 4,700,571, the total movement being 9,407,809 tons, an increase of 3.2 per cent over the previous year. The past ten years have shown a steady increase in the tonnage movement.

Port charges at San Francisco, all things considered, are moderate and the dispatch obtainable in loading and unloading cargo is very favorable. Concerning the dispatch accorded to vessels docking at San Francisco and the port charges the 1908 report of the Board of State Harbor Commissioners reads as follows:

"The rapidity with which a vessel loads and discharges her cargo is one of the factors which determine the profit of the voyage for the ship owner. This is especially true where the charge for dockage is on a per diem rate. Its advantage to the dock owner is also considerable, as a greater number of vessels can be accommodated within a

charged at New Orleans at a rate of 44.7 tons per hour.

"The average rate of discharging cargo at San Francisco was not obtainable, but from recent records of single steamships it would seem to be greater than in foreign ports. The "Korea," which arrived at San Francisco on February 14, 1908, commenced discharging 6,319 tons of cargo at 12:30 p. m. on that date, and completed on the 18th at 1 p. m., within 28 working hours or at the rate of 225.7 tons per working hour.

"Wharf charges and tolls, including stevedoring and pilotage, at San Francisco harbor average about 58.4 cents per ton. The actual tolls for dockage are considerably less than at foreign ports, but the higher wages paid to stevedores bring the average of all port charges somewhat above that of foreign ports, which may be taken as approximately 53 cents per ton."

Table II, compiled from the report of the London Commission in 1902, gives

lines entering the city and with the car ferry slips. The rolling stock consists of three modern switching locomotives, burning fuel oil. The belt railroad handles over 55,000 cars per year or about 150 per day. The Harbor Commissioners think that the road is of great value to the public and in their last biennial report express themselves as follows:

"This road handles cars from trans-bay railroads and delivers them to vari-

ously constructed • is sufficiently advanced, and by this means give railroad car service between all of the docks now in the course of construction and those contemplated and the main trunk railroad lines, together with such adjacent properties as may be able to make rail connections."

Coaling Facilities.

Coal bunkers, accessible by all deep water vessels, are operated in San Fran-

New Wellington (B. C.) coal at the bunkers is supplied to steamships by the Western Fuel Co., for \$7.00 a ton. This is an average price for good steam coal in San Francisco harbor.

Fuel Oil Abundant and Cheap.

San Francisco is the center of the Pacific coast petroleum industry and fuel oil may be had at very moderate prices. Both the Standard Oil Co. and the Union Oil Co., of California, an independent concern, have extensive plants on San Francisco Bay. Fuel oil can be delivered on board steamships for from 70 cents to \$1.00 per barrel of 42 gallons.

During the calendar year ending Dec. 31, 1908, 429,515 tons of foreign coal and 226,186 tons of domestic coal were imported into San Francisco, the total importations amounting to 655,701 tons.

Unusual Repair Facilities.

In spite of the decadence of American shipping, San Francisco is probably better supplied with shipbuilding and repair facilities, including dry docks, than any other port on the Pacific ocean, not excepting Hongkong and Kobe. Among the larger plants for the construction and repair of vessels on San Francisco Bay are those of the Union Iron Works Co., Moore & Scott Iron Works, Risdon Iron Works, Fulton Iron Works (closed), W. A. Boole & Son and D. J. Hanlon & Co.

Among these plants that of the Union Iron Works Co. stands foremost. This plant has obtained a world wide reputation in shipbuilding circles within a few years. A brief description of the works is given below.

The Union Iron Works.

The company grew out of a small shop, founded in 1849 by Peter Donahue. At present, the company owns 35 acres of land facing the Central Basin, San Francisco harbor. On this tract, machine shops, foundries, blacksmith shops, boat shops, etc., have been constructed. The company also controls the dry docks of the San Francisco Dry Dock Co. These docks are five in number, three being floating docks for handling small coasting vessels, while two are graving docks of large capacity. The graving docks are situated at Hunters' Point, two miles from the main plant. The dimensions of the docks are as follows:

	Length at top.	Length on blocks.	Width at top.	Width at bottom.	Depth over sill.
	Feet.	Feet.	Feet.	Feet.	Feet.
Graving docks:					
No. 1, . . .	482	462	97	..	24
No. 2, . . .	750	714	103	86	30
Floating docks:					
No. 1, . . .	301	..	68	..	18
No. 2, . . .	271	..	66	..	18
No. 3, . . .	230	..	62	..	18

TABLE II.

PORT CHARGES AT SAN FRANCISCO COMPARED WITH SIX EUROPEAN PORTS.

Compiled from the report of the Royal Commission, London, 1902. For a cargo steamer of 9,040 tons gross, 5,146 tons net, laden with 5,000 tons grain, 3,000 tons general merchandise and 1,333 M lumber (2,000 tons); discharging.

	Liverpool, 3 Days.	Hamburg, 14 Days.	Rotterdam, 14 Days.	Antwerp, 14 Days.	Bremer- haven, 14 Days.	London, 14 Days.
Harbor and river dues.....	.....	.....	\$ 389.60	.....	.....	\$ 78.34
Dock and quay dues.....	\$1,674.66	\$1,799.76	.....	\$ 730.80	\$1,509.70	1,253.56
Pilotage	120.60	117.30	219.15	277.59	83.94	147.54
Tug hire	116.90	76.43	43.83	77.92	78.39	290.00
Boatmen	53.57	9.47	7.30	24.35	16.56	24.35
Total	\$1,965.73	\$2,002.96	\$ 659.88	\$1,110.66	\$1,688.59	\$1,793.79
Stevedoring	\$1,908.12	\$1,695.27	\$1,071.40	\$1,187.35	\$1,339.80	\$1,826.50
Overtime	633.10	243.50	146.10	243.50	243.50	641.78
Tallying .....	.....	214.28	292.20	292.20	292.20	275.00
Crane hire .....	.....	.....	.....	243.50	.....	145.50
Total	\$2,541.22	\$2,153.05	\$1,509.70	\$1,966.75	\$1,875.50	\$2,888.78
Average port charges per net ton	\$ 0.38	\$ 0.389	\$ 0.127	\$ 0.215	\$ 0.327	\$ 0.348
Average cost stevedoring per actual ton .....	.28	.238	.167	.217	.209	.318
Average total charges ...	\$ 0.66	\$ 0.626	\$ 0.294	\$ 0.432	\$ 0.536	\$ 0.667

SAN FRANCISCO.

16 days at \$41.19.....	\$ 659.04
Tolls, 8,000 tons merchandise and grain.....	400.00
Tolls, 1,333 M lumber.....	133.30
Total port dues.....	\$1,192.34
Average per ton.....	\$0.231
Stevedoring 8,000 tons at 45c.....	\$3,200.00
Stevedoring 1,333 M lumber at 45c.....	599.85
Pilotage (if foreign)	132.00
Total stevedoring and pilotage	\$3,931.85
Average per ton	\$0.393
5,000 tons grain at 35c.....	\$1,750.00
3,000 tons merchandise at 40c.....	1,200.00
1,333 M lumber at 50c.....	666.66
10,000 tons Wharfage*	\$3,616.66
Port charges	36.17c per ton.
Total	\$0.592

COMPARISON OF PORT CHARGES.

	Port Dues.	Stevedoring.	All Charges.
Average six European ports.....	\$.297	\$.239	\$.536
Average at San Francisco .....	.231	.393	.624

*Wharfage charged for goods left on dock exceeding 24 hours.

ous docks, factories, packing houses and warehouses around the water front. The road was constructed in 1891 under an act of the legislature and has been operated continuously by the state. Believing this state railroad to be of inestimable value to the commercial interests, it will be the policy of the Board of State Harbor Commissioners to extend its operations to the territory south of Market street as soon as the completion of the roadway behind the sea-wall re-

cisco by the various fuel companies doing business on the Pacific coast. The principal bunkers are operated by the Western Fuel Co., the Wellington Colliery Co. and the Pacific Coast Coal Co. Owing to the lack of a local coal supply, San Francisco is at a disadvantage compared with other Pacific coast ports in furnishing fuel for steamships. All the coal used is imported, much of it from Washington and British Columbia and some from as far away as Australia.

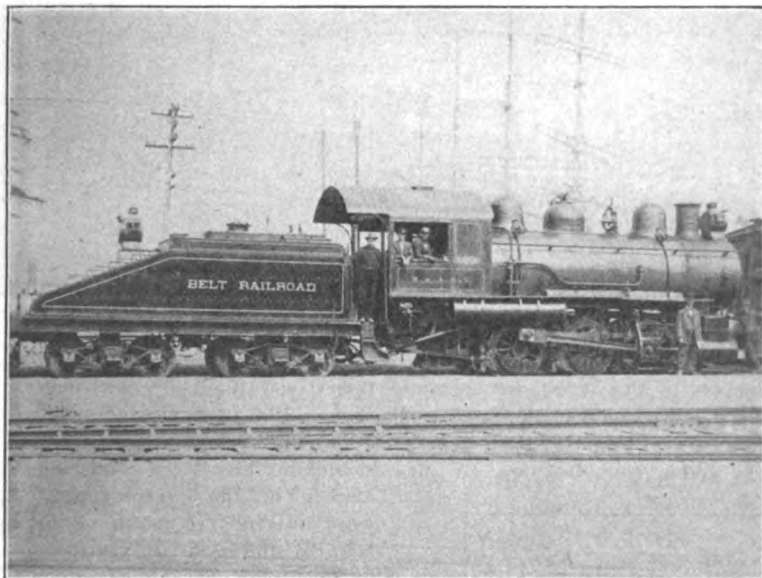


FIG. 8—LOCOMOTIVE ON BELT RAILROAD OPERATED BY HARBOR COMMISSIONERS.

The depth of water at the company's piers is 35 ft. In addition to smaller cranes, including a floating crane, there is a 100-ton electrically operated sheer legs on the pier at the works. This sheer legs has a number of original features and will be described in detail in a later issue of THE MARINE REVIEW.

The repairs to the Pacific Mail Co.'s steamship "Manchuria," resulting from her stranding off Waimanalo, on the Island of Oahu, Hawaiian group, were executed by the Union Iron Works Co. This was one of the largest pieces of work of its kind ever done in the United States. The work consisted of cutting out and renewing the entire bottom of the vessel in addition to removing all line and crank shafting, turning up all crank shaft pins, overhauling and repairing the machinery generally, and re-aligning the machinery after floating the vessel. The "Manchuria" is a high class, twin screw passenger steamer of 13,639 tons gross registry, 600 ft. long by 65 ft. 4 in. beam, by 43 ft. 4 in. molded depth and 1,000 indicated horsepower. The repairs were made at Hunter's Point Dry Dock, two miles distant from the Works in 120 days, requiring the services of over 700 men. Modern facilities were installed at the drydock especially for this work, consisting of air compressors and pipe lines with a capacity for operating 150 air tools. Tracks for locomotive cranes were built to travel completely around the dock and also temporary shops, tools, grinding stations, time-keeping offices, etc., were constructed.

Excellent Harbor Administration.

As was suggested in the opening paragraphs of this article, the most noteworthy feature of the harbor of San

Francisco is the administrative work of the Board of State Harbor Commissioners. In the direction of enlightened and responsible public harbor development, San Francisco stands in the front rank among the seaports of the United States. Many American ports have steadfastly shirked their responsibilities in connection with harbor administration and have left the water front to work out its own salvation, devoid of unity or direction. The result has been a wasteful duplication of facilities in some directions and woeful lack of facilities in others. These ports, which unfortunately are numerous in this country, could study the results achieved in San Francisco, with great profit.

San Francisco is the only port on the Pacific coast and the only one among the cities of the first rank in North America, in which the water front property, piers and improvements are owned by the state and are under the control of the public. With eminent sense the Harbor Commissioners have confined themselves to such activities as are within their legitimate sphere; they have not

undertaken the operation of dry docks, tugs or other facilities which in an ordinary port can be better and more economically managed by private enterprise. They have, however, vigorously co-operated with the United States Government in the removal of rocks and other obstructions from the harbor; they have enacted and enforced suitable harbor regulations, including the location of fairways and forbidden anchorage areas; they have built 12,200 ft. of sea-wall, reclaiming much valuable land; piers, wharves and coal bunkers have been erected as the conditions demanded; the harbor facilities are being continually extended and improved and are kept fully abreast of the demands of commerce; the largest union ferry station in the country has been built and is being operated; a terminal railroad, serving the various wharves and harbor connections, is owned and operated; a wide thoroughfare known as East street, extending along the central section of the water front, has been paved and is kept open for public traffic; the port charges are as low as is consistent with good service and are more reasonable than those of several well administered European ports. This outlines in brief the activities of the State Board of Harbor Commissioners of San Francisco.

The most remarkable and commendable feature of the whole story, however, is contained in the following sentence quoted from the Commissioners' annual report: "*The water front of San Francisco is self-sustaining; that is, it produces a revenue, which pays the expenses and no tribute in the way of public taxation has ever yet been levied or required from the city or the State.*"

As far back as 1851, a rudimentary organization existed for the administration of the public harbor improvements of San Francisco. The valuable water front property, originally held by the state has never been disposed of to private individuals, but has continually been held as a part of the public domain. With this as a basis and the

TABLE III.
REGULAR WAREHOUSES IN VICINITY OF SAN FRANCISCO.

Location—	Warehouses.	Capacity Tons.	Managers.
San Francisco.....	Mission Bay	20,000	Edgar J. De Pue.
San Francisco.....	Gibraltar	6,000	The Haslett Warehouse Co.
San Francisco.....	Battery Street	5,000	The Haslett Warehouse Co.
San Francisco.....	Folsom Street	6,000	The Haslett Warehouse Co.
San Francisco.....	Hathaways	5,000	The Haslett Warehouse Co.
San Francisco.....	Globe	10,000	Globe Grain & Milling Co.
San Francisco.....	Harbor	25,000	Harbor Warehouse Co.
San Francisco.....	China Basin	25,000	Barneson-Hibbard W. H. Co.
Oakland.....	Howard's	10,000	Howard Company.
Port Costa.....	Nevada	75,000	Nevada W. H. & Dock Co.
Port Costa.....	Port Costa W. H. & Dock Co.....	70,000	Port Costa W. H. & Dock Co.
Port Costa.....	California	30,000	Cala, W. H. & Dock Co.
Ecklev.....	Grangers	50,000	Grangers Business Assn.
Crockett.....	Bankers	35,000	The Bankers W. H. Co.
South Vallejo.....	Port Costa Milling Co.....	30,000	Port Costa Milling Co.
Stockton.....	Eureka	35,000	Farmers Union & Milling Co.
Stockton.....	Sperry & Co.'s.....	15,000	Sperry Flour Company.
Stockton.....	Crown	15,000	Stockton Milling Co.
Stockton.....	Cal. Nav. & Impt. Co.'s.....	12,000	Cal. Nav. & Impt. Company.
Stockton.....	Cal. Wharf & W. H. Co.'s.....	16,000	Cal. Wharf & Warehouse Co.
Stockton.....	Stockton W. H. Co.'s.....	25,000	Gurvin & Eyre.



FIG. 9—WATER FRONT OF THE UNION IRON WORKS PLANT.

rudimentary harbor organization as a beginning, the present system of administration was gradually evolved.

The authority is at present vested in

The members of this board are appointed by the governor of the state of California for a term of four years.

Acting under the direction of the

retary and the chief wharfinger. This organization is simple and effective. The duties, privileges and restrictions surrounding the Board and the various officers in the performance of their work are fully set forth in the codified laws of the state of California. It is to the credit of the governors of the state that the board of harbor commissioners has not been made a seat of political jugglery and chicanery, but that able men have been appointed to act on the board and its affairs have been conducted with due respect to the great responsibilities involved. The present Board consists of Walter V. Stafford, president; Walter E. Dennison and Henry J. Crocker. Walter B. Thorpe is secretary, and William H. Davis attorney to the board, while Ralph Barker is assistant state engineer.

San Francisco stands pre-eminent among the ports of the Pacific coast and foremost among the principal harbors of the world, as regards business transacted, harbor facilities and administration. The reason for this success is not far to seek: it is embodied in the splendid natural advantages of the port and in its progressive yet economical and conservative administration for the benefit of the entire community.



FIG. 10—UNION FERRY BUILDING, SAN FRANCISCO.

a board of three commissioners, frequently referred to in this article as the board of state harbor commissioners.

board are the engineering, accounting and operating departments headed respectively by the chief engineer, the sec-

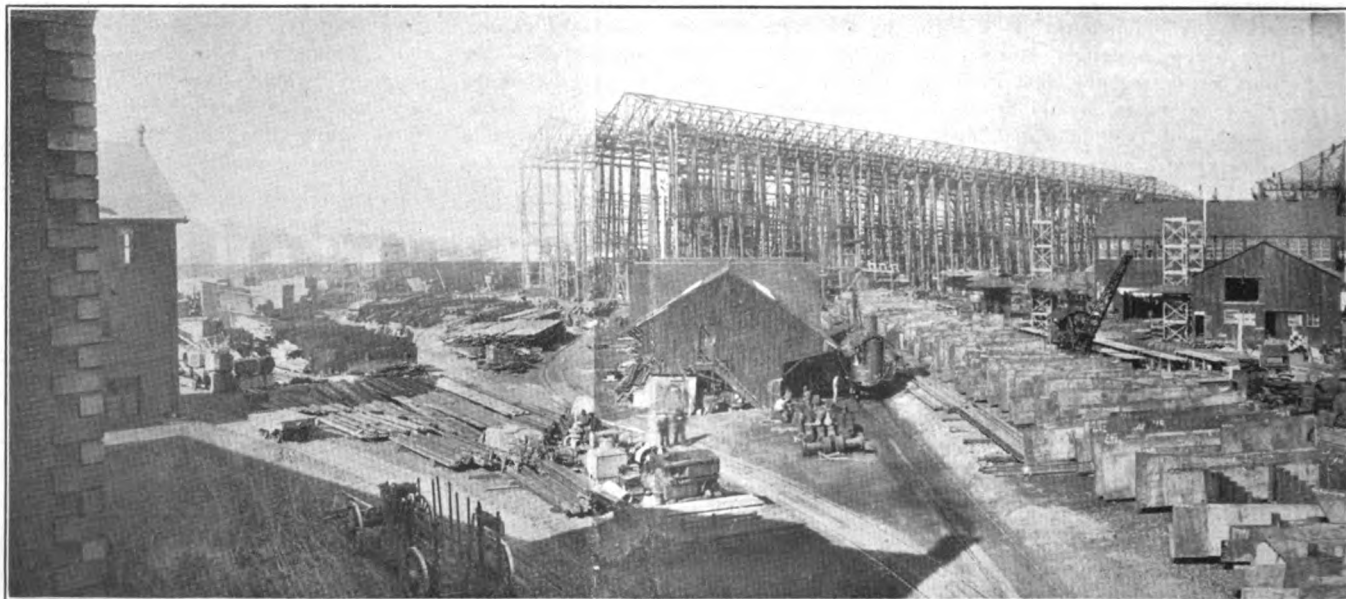


FIG. 11—PLATE STORAGE, UNION IRON WORKS.

PRODIGIOUS SENSATION.

The Baltimore News Has Penetrated the Mystery of the New Bull Steamship.

Hull No. 107, now rapidly nearing completion, will leave the ways of the Maryland Steel Co., the latter part of February. This vessel is being built under the new system of ship building, called the Isherwood system, so named after an Englishman in the navy department of that country. This system of building has the horizontal beam, the beams running parallel with the bulkhead instead of vertical. The boat, however, will have to pass the United States government and Lloyds inspection.

Her dimensions will be 325 ft. length over all, 44 ft. beam, 26½ ft. depth and have a mean draft of 19 ft. She will have a triple expansion engine, and while a single screw steamer, she will be schooner rigged, having two masts.

The boat when completed will be turned over to the A. H. Bull Steamship Co., New York.—*Baltimore News*.

The importance of this announcement can hardly be overestimated. Particulars regarding the construction of this ship have been most carefully guarded and have been restricted entirely to naval architects, engineers and those most interested in the subject, and we are able to announce that it was only through the exercise of talent of the very highest order that the secret has been uncovered. The British Admiralty have rested secure in the assumption that its knowledge of the formula was exclusive, but it is now believed that Germany has also obtained possession and war is likely to break out at any moment. It is reported that Isherwood has not only lost his job in the navy department but has been tried and convicted of lese majeste and sentenced for 99 years to reading proof on technical subjects on the daily papers.

It is said that a demand for royalty has been made upon the American builders, which, believing in a republican form of government, they have indignantly refused, saying "not one cent for tribute" and also "a bas les tyrants" which means "we'll see you further."

It is rumored also that a ship is being constructed on the great lakes on this system and this is believed to be a technical violation of the Clayton-Bulwer treaty which is now in very bad condition and in need of repairs.

Although the battleship *Wolverine* is safely frozen in at Erie, her officers are cool and look for the worst, which is to be ordered into active service next June or July. The situation on the whole is extremely critical and now is the time for all good citizens, etc.

It will readily be understood that the effects of this discovery are far reaching. In the method of construction followed hitherto the vertical

beams standing upon the bulkheads imposed severe strains upon the latter and they had to be made watertight which of course in turn made doors necessary. Breast hooks and transoms also had to be provided and rigidly connected by keelsons and tri-antic stays. The latter were especially required and it is said their weakness caused the loss of the *Republic* as the pressure of the water forced the hold stringers clean through the sheer strake and it was this that really led to the sending out of the famous P. D. Q. signal. These difficulties are avoided by the use of the horizontal beam and it is now possible to carry ballast in the water bottom and thus remove the pressure from the bulkheads. Nor is this all. The removal of the intercostals brings the taffrail, and consequently the center of gravity, further forward, thus favoring the location of the metacenter and adding materially to the speed of the ship. It is confidently expected that negative slip will no longer be a Utopian dream.

The fitting of two-masted schooner rig to a single-screw steamer is also interesting. It has always been considered heretofore that a schooner rig demanded as many screws as masts, some of the six and seven masted schooners having an equal number of propellers. Doubtless more will be learned of this new departure later.

Meantime, in view of the prevailing excitement it is reassuring to know that the approval of United States Inspection is yet to be had. We beg to assure our readers that the well known high standing of our inspection service is a guaranty that if the new system endures the ordeal of their scrutiny it may be taken for granted that they find no reason for opposing it.

SUCCESS OF THE MONITORIA.

Dealing with the Monitor design of vessel with corrugations along the side of the hull, the following statement by the Ericsson Shipping Co., concerning the performance of their steamship *Monitoria*, the first vessel constructed to this design, is published. "Since her loaded trial on Aug. 13, the *Monitoria* has made the following trips: Wear to Stugsund, Sweden; Sandvik to Garston; Penorth to Naples, and is now on a voyage to a European port from Tunis. On the voyage to Garston she carried a cargo of pit props, including a deck load 16 ft. high, and although she encountered very rough weather, the deck cargo never moved. On these trips, under normal conditions, the vessel has averaged about eight and one-half knots

speed on a daily consumption of about 11½ tons of ordinary unscreened bunkers, and has carried 3,300 tons of cargo and bunkers on 18 ft. draught of water. A marked feature has been the splendid sea qualities of the vessel in bad weather. Through the action of the corrugations it has been possible to maintain a much better speed than with tramp steamers of the ordinary form of construction, and the period of roll has been considerably reduced—in fact, the vessel's behavior in a heavy seaway is ideal. The slip of the propeller is also materially reduced, this being from 3 to 6 per cent instead of from 12 to 15 per cent. Everything that was expected of the steamer has now been proved by actual experience, and it is anticipated that before long a further improvement in speed will be shown, or a still smaller consumption of coal."

WORLD'S LARGEST GRAVING DOCK.

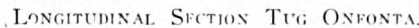
The port of Glasgow, Scotland, has decided to provide a new graving dock, which in regard to dimensions will be the largest in the world. The projected dock is to have an inside length of 1,020 ft., an entrance width of 100 ft., and a depth on the sill at average high water of spring tides of 36 ft. It is to be in two divisions, one of 420 ft. in the inner end, and one of 600 ft. nearest the entrance. It is felt that this dock will be a great asset to the Clyde as a shipbuilding center, since it will not only meet the requirements of the Admiralty as regards the super-Dreadnought-battleships and cruisers, but will also be capable of accommodating the future *Lusitanias* which will doubtless be launched on the Clyde. Being the largest dock of its kind in the world, it will take some five or six years to complete. For the purpose of comparison it may be mentioned that the *Herculanian* No. 2 dock at Liverpool and the *Birkenhead* No. 1 graving dock are each 930 ft. in length, the *Canada* graving dock at Liverpool 925 ft., the *Clyde Trust* No. 3 dock 880 ft., the new dock at Southampton 875 ft., and the new *Belfast* graving dock 825 ft.

PACIFIC MAIL STEAMERS WILL NOT GO TO SEATTLE.

A report has been circulated to the effect that upon the completion of the harbor improvements of the Oregon & Washington railroad (Harriman lines) at Seattle, the steamers of the Pacific Mail Steamship Co., operating between San Francisco and the Orient would make Seattle their eastern terminus, instead of San Francisco. This report has been authoritatively denied. Other arrangements will be made for Harriman steamship service from Seattle.

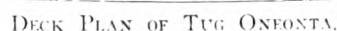
will be fitted an automatic towing machine. Quarters for officers and crew are provided in the deck house and forecabin. The master's room is located in the chart house aft of the pilot house. There will be fitted one mast carrying a derrick boom operated by the steam winch on main deck forward. The contract price of the tug, delivered in Portland, \$92,350.

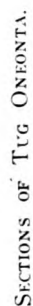
tow. The river towing is done principally by powerful stern-wheelers, but sea-going tugs are required for the section from Astoria into the open ocean. This service is unusually severe, the Columbia river bar being



WHITE STAR LINER OLYMPIC.

It is now definitely settled, subject to unforeseen occurrences, that the launch of the Olympic, the first of the two White Star leviathans, which are being constructed in Belfast, will take place on Thursday, Oct. 20. They are triple-screw, combined reciprocating engine and turbine steamers. The interest which has been, and is being, taken in these two monsters is, of course, exceptional, as the dimensions and weights are so phenomenal, the displacement, when loaded, coming up to nearly 60,000 tons, the gross tonnage being about 45,000 tons, and the launching weight between 25,000 and 30,000 tons.





Bailer Keelson Brackets on Frs "21633.

Naval Architects and Marine Engineers

(Continued from January issue.)

GEORGE W. Dickie's paper on "The Foreign Trade Merchant Marine of the United States—Can it be Revived?" was then read by W. M. McFarland in the absence of Mr. Dickie. This paper will be found in the December issue. President-elect Taylor said that when Mr. Dickie's paper came before the council for consideration he opposed its presentation to the society on the ground that it was not altogether germane to the objects of the society, but considering the importance of the general question he was glad that he had been overruled. Mr. McFarland's abstract of the paper was well done, bringing out all the salient features in very few words and with fine sympathy for the subject.

Discussion of Mr. Dickie's Paper.

W. M. McFarland (communicated): I feel that the thanks of this society are due to Mr. Dickie for his admirable paper, which I am sure contains much information which is new to the majority of us. I feel, too, that our society is probably the most appropriate unofficial body before which this subject of a ship subsidy can be discussed. The bulk of our members being interested in ship building have a vital interest in the subject and those members who are ship owners are interested from that side. Certainly no other body has the information and the great personal interest which are calculated to bring about a discussion of the highest value.

Our society has already committed itself favorably to the general policy of ship subsidies so that I take it the object of the discussion today should be rather as to details than as to the general policy, on which our views can hardly have changed in the last few years. When it comes to discussing details, there will, of course, be a great variety of opinions as Mr. Dickie seems to have anticipated in the closing paragraph of his paper. It really seems to me that best results would be obtained, if we do not rest satisfied with a discussion to be spread upon the minutes, but rather if we appoint a strong committee, representing both the ship owners and the ship builders, with instruction to consider the subject carefully, formulate the reasons which would be likely to appeal to Congress for a subsidy and then be authorized to

appear before the committees of congress as representing our society.

To Formulate Reasons.

I will say at once that, as my work in recent years has not kept me in as close touch with ship building as most of the rest of you, I am not as well posted on the literature of the subject as I would like to be, but with this explanation I would say that it seems to me that the arguments which are usually advanced are too general and of too sentimental a character to appeal to hard headed lawmakers, who have found the budget in recent years increasing at an alarming rate. I think there can be no doubt that there are reasons of a sound economic nature to favor ship subsidies, and it seems to me that this would be one of the advantages to come from the appointment of a committee in that they would have time to formulate these reasons and put them in convincing shape.

It seems very hard to understand why a Congress which has committed itself so strongly to protection should be unwilling to give ship building and ship owning a share in that protection. It is, of course, impossible to do it in the same way, but it has often seemed to me that the fairest way in which protection could be given to an industry would be in the form of a subsidy rather than by the usual method of duties; because it would then be known exactly how much assistance was being given. I have heard it alleged that this is the real objection to a subsidy because of the disclosure of its real cost.

Differs From Mr. Dickie.

With all due respect for Mr. Dickie's excellent judgment, I can hardly agree with the program which he lays out and I know, from discussions which I have had with other members of the society, that there will be a great many who do not agree with him. What he provides for is a series of mail lines. This is well enough, but coming right down to our personal interest in the matter, it seems to me that it would not help ship building a great deal and would really fail to build up the merchant marine for foreign service, which is what we all want to see.

Unless I am greatly mistaken, the fast mail steamers constitute only a small percentage of the carrying tonnage of the world. If we are really

in earnest in our effort to build up a merchant marine, we must strive for a plan which will do much more than fly the flag on a few fine mail steamers.

It also seems to me that the assumption that these American ships are to be manned by crews which are 90 per cent foreign will never do. It is absurd to object to the foreign colliers which went around the world with our battleship fleet and then provide ships which would be essentially foreign, although flying our flag. If the difficulty of operating our ships with Americans, even when aided by a subsidy is so great, then it would seem that foreign shipping is an exotic which cannot be acclimated. I don't think that any of us are ready to agree with such a view, and we must contemplate a plan which will give us ships that are American in personnel as well as material.

Encourage Vessels of all Classes.

What we need is a subsidy in such form that it will encourage the building of vessels of all classes and freighters as well as mail steamers. Here again, such a committee as I have suggested could render most valuable service, because they could suggest or endorse a plan which would bring about that end.

It is the fashion to denounce the politicians and political slates, but there is one thing to be said for their methods; viz., that they teach the lesson that the man who comes forward with a carefully thought out plan has the big advantage of compelling the others to show wherein it is wrong, and if possible to advance a better plan. I am inclined to think in some of the efforts which have been made hitherto, this point has been lost sight of to some extent and sufficient care has not been exercised both to give the sound, economic reasons for a ship subsidy and to show why the method of paying them is the best one.

A Very Important Paper.

I think this is one of the most important papers presented at this meeting and hope that it will have the fullest possible discussion, but, as I have already said, we want to bring all the opinions and all the influence of the society to a focus, and it seems to me that this can best be done by the appointment of a suitable strong committee.

At the conclusion of his communicated discussion Mr. McFarland said: Mr. Dickie speaks of the crew which should be 10 per cent American citizens. If you go to Congress with such a thing as that, you will receive a rebuff. I have admiration for Mr. Dickie, for he is one of the most splendid men we have in this society, but there are some suggestions in his paper with which I cannot agree.

Urges Appointment of Committee.

As I said, Mr. President, the real gist of all I have in mind, is the suggestion that if we are in earnest, and this society believes that it is a desirable thing to build up the American merchant marine, it would pay the country to spend some money to do it, and I believe the thing to do is to have a suitable committee appointed to take charge of the thing, prepare the reasons, present them to Congress, and look after the matter all through Congress.

Mr. E. P. Stratton.

E. P. Stratton: I have listened to the remarks of Mr. McFarland with much interest, and have read the paper of Mr. Dickie likewise, with great interest, but in over forty years' experience with the merchant marine in this country I have had a few things beaten into me that most men have not been able to see, because they have not been dealing with the ramifications as they existed.

It seems to me that the propositions as contained in this paper deal with the results, they do not attempt to remove the cause. The cause of the difficulties with the American merchant marine began when the Congress of the United States failed to make any allowance to the insurance companies in this country for the extra rate of premium and the extra losses which they had sustained in paying for war premiums during the period of the existence of the rebellion. Several millions of dollars were converted into the treasury of the United States, and the consequence of that was the wiping out of every American insurance company in this country, with the exception of two. Hence, foreign companies came into this territory, and when they came to this empire state of New York, our insurance department quietly told them they would have to put up \$200,000, on which they should be taxed for coming into this field, whereas the two remaining insurance companies, operating in this field had to

pay taxes on an aggregate amount of \$20,000,000. This put the representatives of the foreign insurance companies on the inside of American business. It gave them a knowledge of American business from its inception, on a bushel of wheat or a barrel of flour, from the time it started from the west until it reached the European continent.

Touching Upon Insurance.

That condition has gone on from that time until this, and we have very few American insurance companies, and if you build a ship today you cannot insure her in America, you have got to go to foreign companies to place your insurance, and the capital which controls our railroads is largely responsible.

I had the pleasure a few years ago of knowing a distinguished citizen of this country, who has now passed away to the great majority, who proposed to build four 700-ft. ships to run in connection with his railroad. I was in conference with him, and thought the matter was settled when suddenly a gentleman from the other side appeared, and said—"If you will desist from your purpose to build these ships, we will buy so many hundred shares of stock of the railroad, and pay you here so much above the market rate, and all we ask in return is the privilege of carrying the freight on this great system." That arrangement is in operation today.

Railways Feeding Ships.

As early as 1868, when some of our great railroad systems here, several of them combined, found the necessity of replacing a very large bond loan, they went to Europe, and negotiated with a European banking house, and that banking house exacted of that system the right to take this whole loan. In consideration they said—"Gentlemen, we will build a line of ships and run it in connection with your railroad system, and all we ask is the freight of that system." That line of ships is in operation today, and it is for that line of ships largely that the great Ambrose channel has been dug to enable ships of the greatest magnitude to steam into this port and carry away the products of our soil.

A few years ago I was over on the other side looking after the reconstruction of a ship in Belfast, and one day I was invited to the launching of a 20,000-ton ship the next day, and I asked—where is that ship to run to? The reply was—to Boston.

I said—I thought the running of a line of ships to Boston had been proven a failure by the Cunard Co. years ago. The gentleman to whom I was talking said—"Oh, no, a certain system of railroad in the United States has lately become possessed of a line of railroad running from Albany to Boston, and that will give them 240 miles of railroad transfer from Albany to Boston; if that same freight were brought to New York, it would only give them 140 miles." Hence, he said, this company is building four ships to carry this freight from Boston. That was the reason that induced another great railroad system to extend its route to the other end of Long Island, in the hope of establishing a port there. The combination of the railroad interests and the steamship interests is very great in this country, and is controlled in Wall street, and there is a gentleman in Wall street who can control the boards of directors of the great international systems of steamships, and it is that system we have got to deal with—it is that system we have got to satisfy, it is that system we have got to consider in connection with the insurance interests before this system that our distinguished friend refers to will work.

Mr. John Reid.

John Reid: It seems to me that in this little matter of getting a big American shipping trade together there is so much nonsense talked about as to Britain's position in the matter, and Britain's attitude to her own shipping trade, that it would not be a bad idea, perhaps, for me to give you a few words on the subject. I am in sympathy with the movement that the shipbuilders of America get all the ships to build they can, in which to carry her own freight. I am in sympathy with the movement, and am not speaking with my tongue in my cheek. In addition to the advice which Mr. McFarland has given you, I think I can give you this advice, that perfectly sound proposition is not advanced by rotten argument. When I am told that the British government fosters and nurses its shipping trade, I laugh. The British government has hampered its trade by every kind of action and inaction. You say she spends \$7,000,000 a year in mail subsidies. That does not support more than three per cent of the British shipping, and what is more, if you had studied the problem, you would find that every dollar of the \$7,000,000 was well earned.

ed by the English shipowners, and for service, either mail service, which is of enormous expense, of course, or for protected cruiser purposes, and any one who has to build a protected cruiser for the British government and go through the troubles they have to encounter, deserves all the money he can get.

Britain Does Nothing Says Mr. Reid.

The paper of Mr. Dickie in one part says: "In Great Britain, on the contrary, her position among the nations is held to depend on her naval supremacy and so the British shipbuilder had only to learn well his business of building good ships and his government saw to it that the ship owners should not lack encouragement to use them." That is news to me. Britain has never done anything to help the ship owner. She has allowed Germany to control the shipping from the west coast of Africa to the east coast. No subsidy is given on the east coast of Africa, which was practically opened up and explored by British explorers and British seamen, and today if you go to the east coast of Africa you will find that the Germans preponderate, and if you go to the west coast you will find them there also. In fact, Britain has held open for other nations, coasting trade like the Canadian and Australian trade, when the governments of these colonies or dependencies, as we call them, determined to shut it down, and Canada has only now just gotten rid of the Norwegian tonnage, which was practically exploited on the whole Nova Scotia coast, and she had difficulty to do it, because it was held that under certain laws Britain had the right to keep it open.

Buying Tonnage in the Open Market.

Here is another peculiar argument: "Admitting to register foreign built ships as now proposed in a measure before Congress will not revive the shipping of this country; if it would the shipbuilder might be willing to be sacrificed in order that such a result might follow. A country that could not build ships has never, as far as I have been able to find, been able to own and operate them." Now, I want to say that there is most ample evidence to show that numerous countries have thriven as ship owners by buying their tonnage in the cheapest market. Take Norway, Germany, Italy—all these countries are, of course, increasing the number of their own shipbuilding plants, it is only natural, but they have thriven, and

Norway is one of the most astonishing examples of a country with hardly a single shipyard, the greatest ship owning community in the world for its size. So that proposition is not nearly so absurd as it looks, but it would not satisfy the American shipbuilder.

American Less of a Drinker.

The paper further says, "It is sometimes claimed that the American workman is superior to his British brother and will produce as much for the wages paid as any workman in the world." So he does, and he is a good deal less of a drinker, and that helps some. The paper then continued, "There does not appear to be any foundation for this claim as applied to the workmen in American shipyards, as a large proportion of them come from the yards in Great Britain. For piece work of which a good deal is done in shipyards, the price bears about the same ratio to the wages paid here as their piece work price bears to the wages paid there, and the wages average 50 per cent higher here than there." Well, they may, when they come over here, I guess, but the great difficulty is in ship matters you find your level, and you do not find your level in anything quicker, and you cannot afford to spend a penny where a half-penny will do. If you do, you are lost. The sea is free to all, there is no cinch on it, and Britain will go down like any other country if she does not operate her ships under the most economical conditions, and so it is with other nations.

Goes to the Cheapest Market.

The gentleman who spoke just before me advanced a statement that insurance had something to do with it. Now, I am not an expert in insurance, but I know this, that insurance like everything else goes naturally to the cheapest market. You take your lake trade, I guess there is not much grass that grows under the feet of the men who have charge of the lake trade, and who build the ships for this trade. I am not saying that to please the builders here. The insurance of these ships goes straight to London. Why, because no one else finds it worth while to take the business. The insurance goes to the cheapest market, and that is the whole secret of the shipping business, you have got to carry your goods in the cheapest possible way, and while we are a small community as shipbuilders, and anxious to make the most of our work and life, you have

got to consider the enormous mercantile trade that has to pass in the ships, and it has to compete with the trade of China and other countries.

Can't Stand On Sentiment.

I agree with Mr. McFarland that to start this matter on sentiment is utterly impossible. You cannot carry the trade of America in mail steamers. It is preposterous. You must have tramp steamers, and that is the only way you can manage it. There has been some talk about Japan and what she has done. She has developed her naval marine and has also built some splendid mercantile steamers to compete with the C. P. R. The Blue Funnel line, which we all know, and Andrew Weir and other people have so competed with the Japanese lines, that in spite of large subsidies, they are in poor position, with little money to show for their work, which is a good sample of the situation you get into when you organize on a false basis.

Mr. Lewis Nixon.

Lewis Nixon: I have not given the paper the attention which it deserves, but I fear that Mr. Dickie has the point of view of an Englishman, although he has lived in America a great many years. I want to refer to a few points made by the last speaker. I agree with him on one only, and that is that we ought to have a merchant marine made up of cargo steamers, capable of carrying our commerce, and that the possibility of mail subvention is only a sop, although a valuable and important one, and one which has enabled England to achieve her present great supremacy on the ocean, for while we may consider that the original subsidies granted by Great Britain in the beginning of the Cunard line was simply to pass over the surface by meeting the cost of the mail carriage, we know that an entirely different condition arose. When the steam engine came to the front, England naturally saw an opportunity to wrest some of the commerce from us. We were at that time carrying a tremendously large share of the commerce of the rest of the world, in addition to doing practically all of our own, and in 1861 we had as much commerce as Great Britain. When the steamship was first brought on the ocean—they started in 1839 with the Cunard line, although before that they made a so-called agreement of reciprocal commerce, whereby the two companies were not to take advantage of one

another, but to trade on the golden rule, and I will touch on several points of the so-called golden rule, touched on by Mr. Reid.

Mail Subvention Develops Powerful Steamers.

The mail subvention developed great and powerful steamers on the Atlantic, at the same time it was a recognition by the government of the fact that the building of steamships should be developed by government patronage, and through the payment which it was ready to make it would bring upon the ocean a certain number of steamships, and that the building of steamships would mean continuing orders to the shipbuilders of Great Britain. England at the same time gave large contracts for the building of war vessels, and that gave a warrant to the shipbuilders of Great Britain to put in the necessary plants for building steam engines, so that she kept alive the development of the English steamship, but at the same time she was whipped on the ocean in the sailing ship class, for while our ships up to that time cost more, and we had paid the men better wages, and I hope we will continue to do so, because the first act of the Congress of the United States provided for a higher standard of living and higher wages for the sailors,—and in spite of the fact that our ships cost more and we met on terms of equality, we were able to compete and take the trade. To show the character of the competition, when the Cunard line found that the Collins line ships were put on the ocean, they naturally thought that it was going to pieces. It was just before the war, and at that time there was an intense feeling in the south against the building of ships by the government, as the southerners feared that the building of these ships might add to the war strength of the country, and possibly be used against them.

The Cunard line charged £7 10s sterling per ton for freight. The moment the Collins line got in shape to compete with the Cunard line they reduced the charge to £4 per ton, and that has been the result every time.

Acting Adversely to American Interests.

Mr. Reid says too, that the insurance does not have anything to do with it. It is true we have not any American insurance companies at this time, but in 1870, when they wanted to give the last blow to American

sailing ships, there was a revision of the ratings which would be accorded to these ships. It has always been found that the boards of trade, chambers of commerce, insurance companies, and rating companies have always acted adversely to American shipping interests. We can prove this in a number of instances.

Take the case a few years ago when the millers of Great Britain concluded they would like to have a little more of the grinding of wheat in Great Britain. Promptly, there was an order issued by the insurance companies to boards of trade, which had to do with that, which so discriminated against the shipping of wheat ground, that is flour, from the United States, that we are practically shipping no more flour abroad, but nearly all of the shipment is in the form of wheat. These discriminations, which seem on the surface to have no important effect, are the really important ones which make the tonnage all go in one direction. For five years, I have tried to find why certain tonnage left Pennsylvania. They had a very considerable commerce in the beginning of the last century, bringing tea from the east in merchant ships owned in Pennsylvania, they harbored at Philadelphia, and were manned by Pennsylvanians. A tax of one per cent was put on tea brought in Pennsylvania ships, and it promptly transferred that entire trade from Pennsylvania up to New York. It is not that we require some overwhelming and powerful aid, but we need just what Germany has given, that is, a preference for American ships, just as the Germans give a preference for their own ships.

The Situation in Germany.

Now, Mr. Reid says that Germany buys their ships. In 1881 when Bismarck was in the height of his power he called attention to the loss sustained in maritime power; from the fact that Germany was not properly represented in the shipping of the world, and in 1885 they established lines throughout the world, and today through the preference which they give to the German built boats, rebates on the railroad and a few subsidies,—but always placed where they will do the most good—they have brought about a preference for the German ships in the direct trade, which is carrying the German flag all over the world. When they go out and try to get the indirect trade, it is harder to get, while with us the indirect trade is the easiest problem. Germany started the Cosmos line,

running from the eastern coast of South America, around to the western coast, and that is a much favored line. She started a route from Boston which is also very much favored by the Germans. As you have heard, the Oceanic Steamship Co. was forced to withdraw from the field, they got only \$2.00 a mile out of it, and a slow trip in the long distances of the Pacific is relatively faster than in the Atlantic, that is to say, if the Lusitania or Mauretania were to start across the Pacific and keep up the same speed they make in crossing the Atlantic, they could only go one-third of the way across, on account of the deficiency of their coal supply, therefore, the running speeds on the Pacific are not equal to those on the Atlantic. Since the Oceanic Steamship Co. abandoned this line, all the other nations have started ships, and the Germans put their ships out in the same way.

The Case of Norway.

There is this wonderful example of a ship owning nation that does not build its own ships. Norway and Sweden have been the dumping ground for the wornout ships of other nations for years, and if you look at the ages of some of these ships, you will realize what it means. The ship which its owner finds cannot run under the regulations and requirements of the English laws, can run and can have an era of added usefulness under the Norwegian and Swedish flag, and consequently they are put there, very often, not by the Norwegians and Swedes, but by English owners themselves, when the time has come when England will not have any more to do with them. I believe it was said that Norway does not help her ships—she does—they have quite a large subsidy.

English Freight Rates are High.

I am perfectly satisfied that I am correct when I make the statement that the English freight rates average the highest rates that are paid in the world, and that being the case, and a cheap service is what the world is after, I do not see why that business cannot be secured by other boats. But there are certain preliminary things in the way. There is a discrimination in insurance and rating, there is the help, whenever it is needed, by the British government for its ships, but at present it does not need it very much. The one nation which is coming to the front is Germany, and since the Suez Canal

has changed the commercial appearance of all Europe, by building up and enabling Mediterranean traffic to be developed, and such ports as Trieste, Marseilles, Genoa and Naples have come to the front. Germany has developed a deep sea water connection with the entire world, certainly with practically every country of Europe, and we find that England has not the extent of trade she had before the Suez Canal was opened. It has been a distinct disadvantage to her. She has found, through the preference which Germany shows to her own ships, that Germany has been able to make great inroads on the direct trade. You know what I mean by direct trade. It is direct trade from one country with another. If an English ship brings a cargo from England to America, that is direct trade; but if the English ship goes down to Brazil and brings a cargo to us from that point, it is indirect trade. When Germany undertakes to take the direct trade from England she will find other conditions, because the capacity of the Englishman is great for looking out for his own country, and I admire such a nation, and the only sad fact is that we have not properly looked out for our own.

Japan Increasing Her Subsidies.

In regard to Japan, it is said that Japan is poor, and the ships are not paying, but yet we see that Japan is increasing her subsidies and doing practically all the trade with us. The problem of getting all the trade with the Pacific, the forcing of premature peace with China, the signing of the agreement between our secretary of state and Takahira about a year ago, to preserve the statu quo, which statu quo was a puzzling condition, which made for the increase of American commerce in the Pacific, all these have developed to encourage the Japanese, so they do not need the encouragement that we do.

Suspending Discrimination in Indirect Trade.

Now, gentlemen, the whole point is that Mr. Dickie, and a number of others I have heard speak on the subject throughout the United States, has the idea that the only course for the United States is to buy out a participation in our own trade. When in 1828 we passed the law giving the power to the president to suspend discrimination in indirect trade, we started then the crowning act which made for the killing of American commerce on the ocean. Our ships up to that time, 1828, were doing 93

per cent of our own over sea commerce. From that time there has been a constant and steady decline. Of course, that decline was augmented during the Civil war, but since then it has been constant and continuous. Our people will tell you that it is brought about by economical conditions, because of our attention having been given chiefly to the railroads, and because the metal ship was proved to be better than the wooden ship, and the steam engine came in to supplement our decay, but when we were building steamships for a number of years we were holding our own and passing England in our merchant marine until she was able to discriminate against American ships in favor of her own. We gave up the discrimination. We never made a treaty with Great Britain. We have no treaty of commerce and navigation. We have a treaty of peace, which is so lacking in support of American claims and rights, that the War of 1812 was forced upon us, and then, as a condition of peace, when held up, as we were, at the point of a gun, we signed an agreement to give up the direct trade. In 1828, when we concluded to give up the indirect trade, we were then in such position that our commerce was on every ocean, and we thought we could stand alone, without the discrimination which other nations gave to their commerce. Instead of being able to stand alone, we went down.

How to Get Commerce Back.

From my point of view, I believe the right way to get the commerce back is to discriminate in the indirect trade. I find that people realize that subsidies to make up the difference in cost of operation of the cargo vessel, between our cost and that of the foreigner, will not be effective. We have undergone a post graduate course, under the guidance of foreign nations, both in our foreign affairs, and in our local and domestic affairs, and many of our people have come to the conclusion that outside of a mail subvention, and the building of mail lines, the subsidies will be ineffective, and every one of us believe they are unconstitutional. That being the case, I think they are graciously considering allowing us to have them.

Bring on a Commercial War.

We have left the possibility of securing a tremendously large share of American commerce in the indirect trade, and any time any one gets up

to advance that theory the state department opens its archives and presents the objections to that plan, which are familiar to us. They throw their hands up, and tell us that we would bring on a commercial war. There are worse things than a commercial war. The control of the carriage of the world by any nation is something worth fighting for, if necessary, and it is worth while carrying on a commercial crusade to secure it, and endeavor to meet some of the discriminations to which we are subjected by other nations. There is not going to be much in this golden rule business, when it comes to competition for the markets of the world. This trade will not come to us, unless we can find some enlightened way by which we can go out and take it. There are \$300,000,000 of gold spent by this country for carrying people, carrying cargoes, and insurance and banking, and that is a constant drain of money from this country, while our balance of trade in 1907 was nearly \$600,000,000. This \$300,000,000 is the amount we pay foreigners for carrying our traffic on the ocean, which money we want to keep at home. We have tremendous exports abroad. We feed a large proportion of the people of Europe, and supply the factories of Europe with material. In the business world we must get down to a low basic cost factor. One factor is the efficiency of our own people, and I believe that when a man comes over here, and breathes our tonic climate, that man does a little more work. We must, in order to balance our trade exports more and more try to get another string to our bow, and that is to keep at home the gold that now flows abroad.

There are no Treaties.

Some of the objections raised are, that if you repeal some of these treaties, that there will be a commercial war. In the first place, they are not treaties. In 1849, after 21 years, during which a number of other nations had made agreements to stop discrimination in indirect trade between our country and foreign countries, the English did nothing, they stuck to their own navigation laws, good laws at the time, until a man named Ricardo, a bright man, studied the conditions of every one who made agreements or treaties with us, and he found, not only that there was a constant decline of our commerce, but that every other nation which had made a discriminating agreement with us in the indirect trade had pro-

gressed. The logical outcome was that the English parliament passed a law in 1849 that they would discriminate in the indirect trade with us. Without waiting for the proclamation of the law by the United States, we had a cocksure secretary of the treasury, who sent a circular letter of instructions to the custom houses to throw everything open to the English ships. With that tremendous competition, our decline continues, even more rapidly, so the question is—can we at this time rehabilitate ourselves upon the ocean by any measure which will not take money directly from the treasury of the United States to make up differences?

Regain 50 Per Cent.

While I believe in discrimination in the direct and indirect trade, I think we could regain probably 50 per cent of our carriage by one little simple operation, and that is of returning to the old idea of a discriminating tonnage tax, it is not a duty, because we have a number of things on the free list, and I do not believe that people of this country would stand for a 10 per cent increase, but might stand for a 10 per cent decrease. But if we could make a discriminating tonnage tax, by which the foreigner is taxed higher in the indirect trade,—in other words, suppose an English ship goes to Trieste, for a cargo of the products of that country and brings it here, if there is a strong discrimination against that ship, as I say, the small leverage which offers opportunity one way or the other, you would then see that American ships would get that tonnage, and when they come back home they are in better shape to compete for the return tonnage, without which no merchant marine will be self supporting. The question is—who is going to be discriminated against? They put discrimination on Austrian ships in any European port, but some other ships go to that port and bring commerce to an American port. England cannot discriminate against us. She must discriminate against something we bring from here there, and she cannot discriminate against us on that condition. The idea, however, that the American people are so helpless today that they cannot do what their forefathers did, in the way of developing a merchant marine, should be dismissed. Our carriage at that time was being done entirely by the English yet by the application of such a policy in seven years we increased our merchant marine 385 per cent.

I would certainly believe in extending the discrimination even to the direct trade. I do not know that our people are ready for that; but in the indirect trade, it is the easiest, and the only man who will be hurt by it will be the foreigner, and the only one who will be scared is the fellow who thinks that some one might discriminate against us. If we expect to get back this trade without some drastic measure of some sort, we will fool ourselves. If the American people are not big enough to take that trade which they should have, we have deteriorated since the beginning of our history as a nation.

Bonded Warehouses.

Take the question of the bonded warehouses. In 1842 we gave credit to foreigners and to ourselves for a certain length of time, but we were at that time doing practically all the trade. About 1845 the government was rather hard up and stopped the credit in the bonded warehouse business, for both ourselves and the others. Suppose we were doing the major part of the carriage, that was, in a sense, a slight discrimination against us. But now we give them years, and most of the business is done by foreigners—steamship companies, banks, insurance agents, captains, the men who man the ships, all of these handle the great foreign trade. Naturally, they think it belongs to them, and in consequence, they can put their goods here and receive credit for their customers' duty, while they run around the country with drummers to sell it.

Foreigners Sharper Than we Are.

I would find out everything in which we are discriminated against, but the trouble has been that these foreigners as a rule, have been sharper than we have been. They realize that the government had limited powers, that Congress had certain rights, that it had a bounden obligation and duty, the sacred compact of the Confederate States, when it assumed the obligation to regulate commerce, to regulate it so as to keep it on the ocean. In 1828 it gave up its right to regulate commerce. Furthermore, the nations which signed these agreements were quick to substitute means by which they could regulate their commerce, which we were unable to offset, and from that time on their commerce has grown. Not only would I discriminate in the direct trade, but I would penalize every

possible discrimination, device or regulation of our rivals, that makes for the undoing of our own trade.

Any further discussion on this line, would probably lead to its being considered from a political standpoint, and I do not think this is the place for political talk. I have heard a good deal of talk along political lines, and may have a chance at some other time to answer it from a political standpoint. I shall not inject any politics into this meeting.

E. P. Stratton: In view of what Mr. Nixon has said, and the remarks of the speaker who preceded him, I am the more thoroughly convinced of the propriety of the motion made by Mr. McFarland, and hence I rise to second that motion.

Chairman Taylor: There was no motion made, it was only a suggestion.

Mr. Stratton: If Mr. McFarland will frame the motion in proper form, I will second it.

Mr. McFarland: I am perfectly willing to do that, Mr. President. Therefore, in order to carry out the desires in this respect, I move that the president be directed and requested to bring before the council and to confer with them, as to the desirability of appointing a committee of seven members of the society, to take charge of this matter of promotion of the American merchant marine, either by subsidy or otherwise, as found best, and that such committee, if appointed, will be expected to look out for the preparation of reasons and the presentation of this matter to Congress, and also to follow it up when the matter is before Congress.

(To be continued.)

The Port Huron-Duluth Steamship Co. has given an order to the American Ship Building Co. to convert the Wolvin and Cambria, purchased from the Pittsburg Steamship Co., into passenger and freight steamers. The work will be done at Milwaukee. Cabin accommodations will be built on the spar deck containing eighty staterooms. The company operated the Pere Marquette No. 5 last season after the Russia was lost. The headquarters of the company are at Port Huron and the ports of call are Alpena, Sault Ste. Marie, Houghton, Hancock and Duluth.

The steamer *Wilhelmina*, built at Newport News for the Matson Navigation Co., of San Francisco, arrived at that port, having made the run from Newport News in forty-three days.

Iron and Steel Shipbuilding on the Great Lakes

By ROBERT CURR.

THE first iron vessel built on the lakes was probably the U. S. S. Michigan, now the Wolverine, built in 1843, and which, as has been pointed out, is now the oldest iron ship in the world. The name of Cantin, of Montreal, is associated with iron shipbuilding on the St. Lawrence river some years before its adoption in a commercial sense on the Great Lakes. The Merchant is generally recognized as being the first iron steamer built on the lakes for commercial purposes. She was built at Buffalo in 1862 for the late E. T. Evans, and was 200 ft. long, 29 ft. beam and 14 ft. depth, molded to main deck, gross tonnage 861 and her dead weight capacity was about 700 tons. Mr. Evans stated that she was also the first cargo steamer whose boilers were designed for burning coal, the fuel of the day being universally wood, which could be obtained in abundance along the lakes and through the rivers.

From 1862 to 1871, iron shipbuilding made little progress, the largest craft being the car ferry Great Western of 1,080 gross tons, built at what is now called Walkerville, Can., in 1865, and the Philadelphia of 1,463 gross tons, built at Buffalo in 1868.

There were in addition several tugs and small craft, but iron was still too expensive a material for general use.

In 1871, a "boom" seems to have set in, as in that year five vessels of a total gross tonnage of 6,400 were built at Buffalo. In 1872, Buffalo turned out four vessels of 6,054 gross tons, a substantial increase in average tonnage, especially as three of those of 1871 were passenger ships, and Canada turned out one car ferry, the International, at Sarnia, of 851 tons.

In 1872, the large tug E. B. Ward of 550 tons, and the Queen of the Lakes, 153 tons, were also launched at Wyandotte.

Between 1873 and 1878 a severe depression prevailed and shipbuilding suffered in common with other lines of business. Few steamers were built, though the building of schooners continued and the tonnage was almost exclusively of wood. The Grand Trunk Railway built at Sarnia in 1875, a second car ferry, the Huron, of 1,052 tons. In 1877, a composite steamer, the first City of Detroit, of 1,094 tons, was built at Wyandotte. In 1878, two steamers,

the Arundell, 339 tons, and the Ivanhoe, 277 tons, were built.

In 1879, the Idlewild, 363 gross tons, was built at Wyandotte.

In 1880, there were built at Wyandotte, four steamers of a total of 6,350 gross tons.

In 1881, there were built at Wyandotte, five vessels of a total gross tonnage of 6,320.

In 1882, the Onoko, 2,164, and Jewett, 1,953 gross tons register were built.

In 1883, one passenger steamer, the State of New York, was built, having a gross register tonnage of 807 tons.

During 1884, four steel steamers were built with a total register tonnage of 6,927 tons, and one iron vessel measuring 1,581 gross register tons. This year apparently marks the introduction of steel vessels on the Great Lakes.

Year.	Vessel.	Gross Register Tonnage.
1862.....	1	861
1871.....	5	6,400
1872.....	7	7,608
1873.....	1	1,395
1875.....	1	1,052
1877.....	1	1,094
1878.....	2	616
1879.....	1	363
1880.....	4	6,350
1881.....	5	6,320
1882.....	2	4,117
1883.....	1	807
1884.....	5	8,508
1885.....	5	4,697
1886.....	5	9,396
1887.....	4	8,322
1888.....	14	29,639
1889.....	14	31,413
1890.....	18	34,880
1891.....	13	27,154
1892.....	18	36,542
1893.....	18	46,420
1894.....	5	16,379
1895.....	12	37,080
1896.....	30	102,449
1897.....	18	57,776
1898.....	17	59,976
1899.....	15	60,862
1900.....	26	114,284
1901.....	34	116,671
1902.....	35	142,195
1903.....	51	172,680
1904.....	9	38,558
1905.....	26	145,472
1906.....	41	246,335
1907.....	47	279,687
1908.....	29	130,938
Total	540	1,995,296

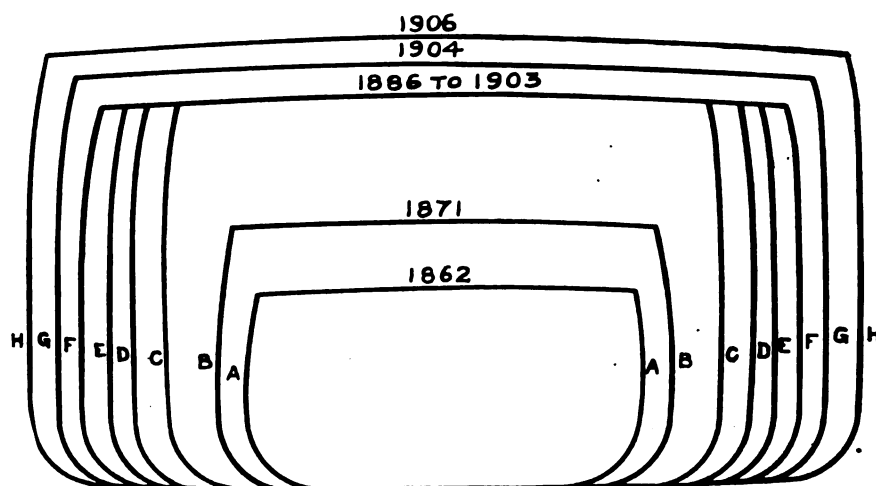


FIG. A.

The year 1885 has only one steel vessel to its credit and four of iron. The iron vessels had a total of 4,535 and steel 162 gross registered tons.

In 1886 five vessels were built of steel during this year with a total gross register tonnage of 6,475 and one iron vessel measuring 2,894 tons. This apparently was the last use of iron for shipbuilding.

Ending this year, there were 38 vessels built of iron measuring 46,000 gross register tons and eight steel vessels, measuring 13,564 tons.

In 1887, four steel vessels were built during this year, adding 8,322 gross register tons to the list.

The following table shows the number of vessels, over 200 ft. long, built, and the total gross register tonnage from the year 1862 until 1908, inclusive:

As shown by the above table, the tonnage began to increase rapidly from the year 1888, when 14 vessels were built, increasing the gross register tonnage by 29,639 tons.

The year 1894 had only five vessels with a tonnage of 16,379 to add to the list.

The year 1903 has the greatest number of vessels built, being 51, while 1907 with 47 vessels has a gross register tonnage of 279,687, the greatest of any year.

The average tons per vessel for 1906 was slightly over 6,000 gross register tons, while 1907 fell slightly below that tonnage. The year 1908 has a still lower average per vessel, owners apparently favoring the smaller craft.

The following table gives a comparison of the beam and tonnage for lake

vessels built of iron and steel from 1862 to 1906:

Year.	Beam.	Gross registered tonnage.
1862.....	29	861
1871.....	32	1,239
1872.....	35	1,500
1880.....	36	1,800
1882.....	38	*2,164
1886.....	40	2,781
1893.....	45	3,746
1895.....	48	†4,527
1899.....	50	5,322
1900.....	52	5,946
1904.....	56	6,585
1905.....	60	6,838
1906.....	60	†7,971

*Tonnage double that of 1871.

†Tonnage double that of 1882.

‡Tonnage double that of 1895.

It will be observed that the vessel of 1882 was increased to nearly double that of 1871.

By 1895 the vessel's size had increased again to double that of the 1882 type, and 1906 shows that the size had doubled again as compared with 1895.

The vessels now being built are six times larger than the design of 1871.

Fig. A shows the sections from 1862 to 1906 or present day section of steel freight vessels:

- A is the first American built metal merchant vessel, 1862.
- B vessels of the 1871 type.
- C vessels of the 1886 type.
- D vessels of the 1893 type.
- E vessels of the 1895 type.
- F vessels of the 1903 type.
- G vessels of the 1904 type.
- H vessels of the 1906 type.

The 1906 vessels are 585 ft. x 60 ft. x 32 ft. deep. At present there seems to be no desire to go beyond that size.

When the Onoko was built in the year 1882 with her 2,164 gross register tonnage, the good judgment in building so large a vessel was very seriously questioned. In 1895, it was again claimed the limit had been reached, but since then vessels have been doubled in capacity.

There has been built on the Great Lakes, ending 1909, 553 iron and steel vessels, 200 ft. and over and 128 under that length, the total gross register tonnage amounting to 2,100,000 tons.

The passenger vessels do not show such a rapid increase in dimensions as the freight craft.

The North West and North Land made the greatest departure in 1894 and 1895. In 1907, the City of Cleveland came out with a greater gross register tonnage than these two vessels. She is 402 ft. over all, 390 ft. keel, 52 ft. wide and 22 ft. deep.

The following table gives a comparison of steel and iron passenger vessels from 1878 to the present time:

Name of vessel.	Year.	Gross registered tons.
City of Straits.....	1878	1,094
State of Ohio.....	1880	1,222
Landowne.....	1884	1,571
City of Detroit.....	1889	1,919
Manitow.....	1893	2,944
North West.....	1894	2,444
City of Buffalo.....	1896	2,940
Eastern and Western States.....	1902	3,077
City of Cleveland.....	1907	4,568

This article is confined to the United States built vessels.

WAGES OF ENGINEERS.

During the annual meeting of the Lake Carriers' Association at Detroit the executive committee of the association announced certain changes in the wage schedule for engineers, the purpose being to equalize certain discrepancies existing in the scale as between the various classes of steamers. No change was made in the schedule of first class steamers, which remains at \$175 for the chief engineer.

The wages of engineers on Class B steamers was advanced from \$150 to \$155 per month and on second class steamers from \$125 to \$140, and on third class steamers from \$114 to \$125. The fleet engineers later recommended that the wages of assistant engineers be somewhat increased and this was approved by the executive committee. The wages of first assistant engineers were increased from \$10 to \$16 a month and a flat rate of \$80 adopted for second assistant engineers. The wage schedule therefore will be:

Steel Steamers.

FIRST CLASS -A.

	Per Month.
Chief engineer	\$175
First assistant	125
Second assistant	80

CLASS B.

Chief engineer	\$155
First assistant	110
Second assistant	80

SECOND CLASS.

Chief engineer	\$140
Assistant	100

Wooden Steamers.

FIRST CLASS.

Chief engineer	\$140
Assistant	100

SECOND CLASS.

Chief engineer	\$125
Assistant	100

While no announcement has been made it is understood that the Pittsburgh Steamship Co. will pay its engineers for 11 months, making their earnings for the season \$1,925. The engineers work upon a monthly basis, the season usually averaging 10 months. Some of the companies guarantee a season of 10 months but the Pittsburgh Steamship Co. is the first to spontaneously offer 11 months pay. It is understood that a number of the Pittsburgh Steamship Co.'s engineers will leave for their boats on March 1.

The Marine Engineers' Beneficial Association promulgated a schedule of wages purported to have been adopted at their Washington conference, but which really appears to have been an after thought, increasing the wages of chief engineers from \$175 to \$190. No attention was paid to this.

TWO LAKE LAUNCHINGS.

The steamer Leonard B. Miller, building for the Miller Transit Co., of which Capt. W. C. Richardson is manager, was launched from the Cleveland yard of the American Ship Building Co. on Saturday, Jan. 29, and was named in honor of Mr. Miller, of the firm of Oglebay, Norton & Co., the steamer being christened by his daughter Helen.

The Miller is 524 ft. over all, 504 ft. keel, 54 ft. beam and 34 ft. deep. The cargo hold is divided into three compartments, each compartment having five hatches spaced 24 ft. centers and with an opening 12 ft. fore and aft. It is observed that Capt. Richardson still clings to the large hatch, believing that the vessel is materially strengthened thereby. The steamer also has 64 deck beams, adding greatly to her strength. The hatches will be handled by two independent deck engines with a bridle and will be equipped with Mulholland hatch fasteners. Hatch coamings will be of the peak style. The new steamer is of arch construction with side tanks extending through to engine room bulkhead. She is expected to carry 9,300 tons of ore on favorable draught.

Capt. Richardson has given much personal attention to the construction of his new steamer and has introduced a number of little improvements making for the comfort of the crew. She will be commanded by Capt. Thomas Wilford, of Lorain.

The steamer John P. Reiss was also launched the same day from the Lorain yard for the Reiss Coal Co., of Sheboygan. This vessel was ordered for John J. Barlum, of Detroit, but was sold to the Reiss company while on the stocks.

The Reiss is 524 ft. over all, 504 ft. keel, 54 ft. beam and 30 ft. deep. She will be commanded by Capt. James Doner.

BATTLESHIPS FOR ARGENTINE REPUBLIC.

The Argentine Republic has given contract to the Fore River Ship Building Co., Quincy, Mass., for the construction of two battleships of the largest type. President Francis T. Bowles recently visited Argentina in behalf of his company.

It is part of the contract that one of the battleships shall be built in another yard and it is understood that this order has been given to the New York Ship Building Co.



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THE GOVERNMENT'S FACTOR OF SAFETY.

Under the above caption *Power and The Engineer* has some fun with the steamboat inspection laws as regards the construction of boilers. There is no danger of our contemporary becoming unduly severe; so far as the law is concerned its criticisms are all true and more besides. We have on several occasions dealt with the antiquated collection of junk masquerading under the name of Steamboat Inspection Rules. In our issue of June, 1909, we said: "So far as actual control of the design of boilers is concerned, the United States steamboat inspection law is a joke and not a very good one at that."

As a matter of fact, the certificate

of inspection granted to every modern steamer is illegal. There is no warrant for its issue, because the law does not recognize and does not authorize the use of any form of joint in boiler construction other than the lap seam. That we have boilers even so good as they are is due in no sense whatever to the law. The modern marine boiler is practically built in defiance of the law; it could not be built otherwise. The situation is one of the strangest imaginable.

It is incorrect, however, to say that efforts at reform are blocked by the ship owners. There is no foundation, whatever, for such an assertion, and we cannot understand why it should be made.

Time after time both owners and builders have endeavored to have rules modernized through the Board of Supervising Inspectors, and as the present rule for determining working pressure is fixed by an act of Congress and not by the Board, Congressional action must be had, but for some reason the Board has never moved in the matter, while tacitly overlooking the fact that they have no authority so far as the vast majority of marine boilers as built are concerned.

If anyone were interested in the retention of the present rules, it would naturally be the builders, but they have been the most insistent on revision. Every one knows the present rule is a farce, and no one pays any attention to it.

As a matter of fact, standard marine boiler practice gives an actual safety factor of about five, as compared with the British 4.5, but this, of course, refers to boilers of the larger and heavier types. Doubtless there are numbers of small and river-boat boilers, in which the factor is far lower, but they, or those building or using them, have not stood in the way of revision. None of the steamboat inspection rules, where boilers are concerned, have ever been retroactive, and there has never been any modification proposed, so far as we are aware, which contemplated or affected boilers already built. In fact, such action would be impossible.

It would be interesting to know what would be the outcome of a claim for damages for injury or loss caused by the failure of a marine boiler of modern design, and whether action could be maintained on the ground that the law

makes no provision for butt-strapped seams, no matter how high the value may be.

The rule for calculating the working pressure of boilers is only one of the absurdities, however, with which the present rules fairly bristle. There is pending before Congress a bill which is designed to do away with the entire existing patchwork collection and put the framing of inspection rules entirely in the hands of the Board of Supervising Inspectors and repeals the acts of Congress on which the old rules are based. But in many respects the proposed new rules are worse than the old, as is only to be expected. Of the commission appointed by President Roosevelt to consider the subject only two members may be said to have known anything of the subject. Appointing naval officers to frame rules for the merchant marine might be expected to result in confusion and dissatisfaction and that is just exactly what happened. They provided for nice soft berths for eight naval officers "not below the rank of commander" on the proposed eight examining boards, who are to examine all candidates for licenses, and suspend, issue or revoke the same and conduct inquiries and perform sundry other duties now executed by the local inspectors whose duties are apparently to be confined to actual inspection of vessels. There are many other asinine suggestions, too, such as requiring a motor boat, no matter how small, to carry a substantial life boat, or a motor boat, which may go 40 miles off shore, must be fitted with wireless telegraph. When such monstrosities as these and many others are seriously proposed by a commission named by the President, what hope is there that a question involving even the moderate technical knowledge required to frame a rule for boiler seams will receive consideration? Commissioner Chamberlain did no more than any self respecting man of ordinary sense when he emphatically refused to concur in the report.

There is, fortunately, no great danger of the bill passing in its present shape, though builders and owners the country over would enthusiastically support a sensible, intelligent effort to put the inspection rules on a higher plane than they have yet occupied.

IN AID OF COASTWISE SHIPPING.

Section 4347 of the United States revised statutes provides that:

No merchandise shall be transported under penalty of forfeiture thereof, from one port of the United States to another port of the United States in a vessel belonging wholly or in part to a subject of any foreign country.

By the act of Feb. 17, 1898, the foregoing was amended to read as follows:

That no merchandise shall be transported by water under penalty of forfeiture thereof, from one port of the United States to another port of the United States, either directly or via a foreign port, or for any part of the voyage, in any other vessel than a vessel of the United States.

The famous opinion by former Attorney General Bonaparte, upon which the government justifies its action in transporting naval coal from the Atlantic coast to the Pacific coast, and from Atlantic coast ports to Porto Rico, is, after quoting certain authorities, as follows:

The sovereign authority of the country is not bound by the words of a statute unless named therein. If, therefore, there had been nothing in the language of this statute to indicate whether it was or was not intended to apply to merchandise owned by the United States, the rule of construction to which I have referred would require that it be held not to have such application.

Fortified by this opinion, the navy department has transported hundreds of thousands of tons of naval coal in foreign ships, to the exclusion and damage of American shipping, because of the somewhat lower rates obtainable. In order to rectify this condition, the following joint resolution has been introduced by Congressman E. A. Hayes, of California.

Joint Resolution No. 129.

To provide for the transportation by sea of men, material, stores and equipment for account of the United States, and of material, stores and equipment for use in the construction or maintenance of the Panama canal.

Resolved by the Senate and House of Representatives of the United States in Congress assembled:

That hereafter the transportation by sea of (a) materials, stores and equipment for the use of the army or navy of the United States; of (b) the forces of the United States; of (c) materials, stores and equipment from the United States for use in the construction of the Panama canal and (d) of all material and equipment for use in construction or maintenance of fortifications, harbors, navy yards, naval stations or other works for account of the United States, shall be restricted to vessels of the United States, and no others, and such transportation, when time will permit, shall be furnished by contract, after proper advertisement, by the lowest bidder complying with the requirements of the United States.

The resolution needs no justification. That a law which binds and applies to every citizen of the United States and to every alien doing business here does not apply to the government itself is so absolutely at variance with all good sense; is so perfectly ridiculous, that it is a reflection on national sanity. One finds difficulty in avoiding the conclusion that a loophole of escape is only found after patient search prompted by desire. Only a so-called "legal mind" is capable of the delicate differentiation, especially under a republican form of government, which is the people itself. Possibly under a monarchical form the distinction might hold, since the titular head, the king, is an entity in himself, though some of them have lost their heads for insisting upon it. One of the clauses of the Declaration of Independence sets forth that "the governments of all civilized peoples derive their just powers from the consent of the governed;" how then can the United States possess powers superior to those which the source of power has decreed for itself? There is no citizen who will subscribe to such a doctrine.

Mr. Hayes' resolution has been most carefully drawn and its words well chosen in order to close the loophole which Mr. Bonaparte, with his subtle brain and microscopic eye, discovered for the convenience of the navy department, and which the war department are likewise taking advantage of.

TRANSFER OF HYDROGRAPHIC WORK.

There is a movement on foot in Washington to transfer a very important part of the work of the Hydrographic office to the agricultural department which is being strenuously opposed by marine interests. The notice to mariners, published weekly, the pilot chart of the great lakes and the Hydrographic bulletin certainly should be prepared by men having a knowledge of conditions existing on board ship. It certainly seems folly to turn it over to a department not having any training in that line. Lake vessel interests have already registered a protest against the proposed transfer, which appears to be advocated by the weather bureau.

NAVY COAL SITUATION.

The following letter from George F. Thorndyke to Congressman H. C. Loudenslager contains a fair resume of the latest development of the navy coal situation and is very interesting:

Jan. 14, 1910.

Hon. H. C. Loudenslager,
House of Representatives,
Washington, D. C.

Dear Sir:—

I am in receipt of a pamphlet (No. 10), same being statement of Paymaster General Eustice B. Rogers, before the Committee of Naval affairs under date of Monday, Dec. 13, 1909. As I have corresponded with you heretofore in regard to the vexing subject of transportation of Pocahontas coal to the Pacific coast in steamers of foreign ownership and dismissed by the charterers, the United States Navy, here, I now take the liberty of again addressing you because I find that your interrogations of Paymaster General Rogers denoted interest in the subject on your part, which showed apparently that you are friendly to the shipping interests of this coast. I find that on page 328 of the statement herein referred to, that Paymaster Rogers made "a quotation with regard to the requirements for the shipment of supplies for the Army and Navy (and especially coal) in American bottoms. Following is the quotation:

"Resolved, that no greater charges be made by such vessels for transportation of the articles for use of the army and navy than are made by such vessels for the transportation of like goods for private parties."

It would have been a good thing, it seems to me, to have had it included in the record immediately after Mr. Rogers offered quotations, what rates of freight on cargoes of bulk coal is customarily paid by private parties chartering American vessels for voyage from the Atlantic to the Pacific coasts. For your information I would state, that the rate varies from \$3.50 to \$8.00 per ton. The most recent charter for similar business was the J. L. Luckenback with bulk coal consigned to the Pacific Coast Coal Co. of San Francisco and this city. The Naval committee can easily ascertain the customary rates from either the Western Fuel Co. of San Francisco, the Pacific Coast Coal Co. or the Cumberland Coal Co. of this city, who at regular periods purchase cargoes of coal on the Atlantic for consumption here. To be perfectly fair with American shipping, if the government's

requirements permit that shipments shall be made in American vessels when no greater charge is demanded, it is its duty to ship in American vessels when offered rates equal to those customarily paid by private parties, thus I beg to state that our presidents were wrong in their decision that because American owners demands were 50 per cent greater than those of foreign vessels, that the business should be given to foreign vessels, because the American rates were excessive and unreasonable. It is to be assumed that we are on an American basis. It is not necessary for our government to look to London for quotations of freight rates, which rates shall in any way affect those made by American shipowners. It is fairer to our shipping if customary rates in existence in the trade concerned are offered rather than to consider those rates made by foreign interests for the purpose of further crippling our already demoralized merchant marine. I observe it was included in the record that the rates quoted the government run from \$3.35 to \$3.50 per ton, which statement appears on pages 324 and 325. As a fact those are the lowest quotations the government ever received for delivery to San Francisco, Puget Sound and the Hawaiian Islands. Those are the rates made for the twelve or fifteen vessels which came to this coast the last half of 1909. Prior to that time their tenders were similar to \$4.50 to \$5.15 per ton, while on Dec. 18 those tenders received from foreign ship interests for the same service, ranges from \$4.50 per ton to nearly \$7.00.

In fairness to the American shipowners' quotations, it should have been shown in the record that those rates named above included bare transportation only, that the government pays in addition thereto the cost for trimming and loading, port charges enroute; stevedoring, discharging and it waives customs dues at the port of shipment and delivery.

It would have been a good plan to have had it shown in the record that heretofore the department has required its vast shipments to be made upon short notice and in quick time, for instance 75,000 tons of coal was delivered on the Pacific during the month of July and August last. I think it should be shown in the records that no honest efforts have ever been made to secure American ships for making coal deliveries to this coast at regular stated periods during the year, on a schedule arranged whereby eight or ten vessels could be regularly

employed in carrying the coal to this coast, and returning with cargoes of the products of this country. Had this plan been adopted, American vessels to a great extent could have been secured, requiring the employment of a much smaller amount of foreign steamers. Also had this been done, American vessels could have gradually decreased their coal rates along with the increase of volume of eastbound business. Further than that if the department will assume a fixed friendly policy in that regard, larger American vessels would soon be forthcoming. It is such assistance similar to above that the American Merchant Marine demands from our government, more so than direct subsidy. This and similar things other countries do for their shipping.

I observe it was woven into the record of the committee meeting of Dec. 13, 1909, that Japanese Naval vessels consume the best coal procurable in their country. It was not shown that vessels foreign to its country were engaged to transport Welsh, Pocahontas, or any other coal mined eight or ten thousand miles distant from the said naval vessels. As a matter of fact, Japan does not thus transport coal for her vessels. Last summer two Japanese cruisers visited cities on Puget Sound and purchased coal mined in King county, this state, for consumption on their homeward voyage.

With reference to Mr. Wm. McMasters' letter, secretary of the Portland Chamber of Commerce, appearing in the record of page 359, I beg to advise that his is an entire mis-statement of facts. I also make the same remarks regarding the resolutions appearing in the record on page 313, which resolutions were inspired by an anonymous letter sent out from Portland, Ore., by one or two foreign shipping firms in that city, a copy of which I will arrange to have sent you by Mr. John A. Penton, Cleveland, to whom I sent the circular. In refutation of the charges made by Mr. McMasters and the resolutions passed by the Farmers of Umatilla county and other similar resolutions from Oregon and Washington, I am enclosing the *San Francisco Commercial News* which contains the statement of the sailings from this coast of the Oregon and Puget Sound grain fleet in 1909, which includes the name of only one steamer which comprised the fleet of twelve or fifteen steamers which the government dismissed from its service here during July and August last, and prior to the actual commencement of grain ship-

ments hence, the others having loaded lumber, coal or merchandise in competition with American owned vessels.

The vessel referred to as having taken wheat is the Baron Napiere appearing on the page 15 of the within enclosure.

There are at present two foreign grain ships idle in San Francisco, and fifteen idle on Puget Sound, which vessels were unable to secure wheat at the European Union rates of 27/6, and because of the rules of that combination, have declined to accept grain cargoes at a less rate; but offered for lumber, coal and merchandise at ridiculous rates to prevent American vessels from securing same.

With reference to Mr. McMasters' statement to the effect that foreign vessels do not interfere with vessels of American ownership on this coast, the latter being engaged exclusively in the coastwise business, I refer you to page 15 of enclosure, which contains a table concerning the Pacific coast lumber fleet of 1909. You will observe that thirty vessels appear to have taken cargoes of lumber to countries foreign to this during November and December, nineteen of which were American and eleven foreign. I am sorry I cannot supply you with an annual statement showing the number of American vessels engaged in the foreign lumber trade from this coast; but in round figures, out of about three hundred and eighty-five of such vessels enrolled here, 40 per cent trade foreign. The foreign lumber business from this coast was originally worked up by Pacific coast American vessels. It goes without saying they formerly enjoyed about 100 per cent of the business. In 1909 they carried less than 25 per cent of the volume of lumber exported and within two years if the Navy department continues its present policy, our interest in the trade will be entirely lost, which will be the last chapter of the bottling of American commerce by foreign shipping and other interests.

This is a long letter; but I hope not too long, and that you will find time to peruse its contents, and use the information contained therein in the way you deem best.

Yours truly,

(Signed) G. F. Thorndyke.

Joseph F. Hayes has resigned as fleet engineer of the lines operated by A. B. Wolvin, of Duluth, and will go into business in Cleveland in association with W. H. Thompson.

The Naval "Reorganization"

(The letter printed below is a frank and fearless criticism of the latest reorganization of the navy department, and throws a great deal of light on the dark places of naval administration in the United States. The letter, which comes to us as a great surprise, but not the less gratifying on that account, is by a business man and engineer of wide experience, who resides and received his education on the coast and among coast yards and who has been privileged to observe at close range the workings of the navy department at Washington and also the management of several navy yards on both coasts. He has often been called in consultation by some of the largest merchant ship building plants in America, and if the *Review* were privileged to use his name there would be no necessity for vouching for his authority and experience. If an investigation were ordered there is none whose testimony would carry greater weight.—Ed.)

Editor MARINE REVIEW:—I approve and endorse almost every word you have published in criticism of naval maladministration and I think it unnecessary to say anything as to my opportunities of forming opinions on the subject. I think, however, that you have almost entirely missed the greatest fraud of all except in your editorial on naval reorganization in your December number.

Is Congress going to be hoodwinked by this so called Meyer naval reorganization? Are the American people to be fooled again by the naval clique? The so called Meyer scheme of reorganization is not Mr. Meyer's scheme at all; it is a scheme devised by admirals, captains and commanders, who know nothing of business management, who know nothing of industrial life; it is a scheme devised by these same admirals, captains and commanders to increase their power, to magnify their importance and to provide pleasant shore stations for a large number of line officers. Is the extravagance and waste in the navy to continue? Will the people believe that the navy is saved by the Meyer reorganization and feeling secure will not demand the investigation that is needed—the investigation that THE MARINE REVIEW has suggested and will better conditions and make the naval administration what it should be?

Newberry Was Not Fooled.

With all of the press agents of the powerful line clique at work flooding the country with glowing accounts of the wonderful reorganization that has been carried out, if some one does not place the true facts before the country, it is quite possible that Congress and the people may again be fooled by these naval autocrats. You have presented a strong array of facts and it is to be hoped you will continue to present these facts until something is done to bring about a real reorganization of the navy—a reorganization which will produce a businesslike, efficient administration of naval affairs.

Mr. Newberry is a business man; he has had experience in industrial management; he knows what the navy needs. It is possible that even Mr. Newberry was dazzled and fooled when he first went to Washington by the array of admirals, captains and commanders that surrounded him. No doubt he also was told that the navy, including the navy yards with their machine shops, blacksmith shops, foundries, joiner shops, etc., is a fighting machine and should be commanded and controlled by the fighting officers (the line always refer to themselves as the fighting officers). No doubt Mr. Newberry was told that the line officers can do everything from commanding a fleet to running a blacksmith shop. All newcomers in the navy department go through this stage and all are hoodwinked in the beginning; but it is quite certain that even though Mr. Newberry may have been fooled in the beginning, it did not last. He was in the navy department for several years; he made a thorough study of the situation and he found out the needs of the navy and as soon as he was given the power he took the first steps to remedy conditions and there is little doubt that if he had remained secretary that he would eventually have produced an efficient naval administration. Mr. Newberry recognized that a good "fighting officer" did not make a good manager of a navy yard or a good constructor or a good engineer. He recognized that years of training in industrial management are required to make a good manager. It is said that Mr. Newberry told members of the naval committee that he recognized that line officers should have some shore duty, but they should not be given duty in responsible positions where they would and did waste millions of the people's money. It is stated that he told the committee that the government would save money if it would build homes for these officers at some fashionable resort and order them to these homes on full pay instead of sending them to the navy yards to play at running a large industrial establishment. This is the opinion held by every business man who has studied navy yard conditions.

Saw Their Soft Snaps Going.

Under the Newberry plan the line officers saw their soft snaps going; they saw their authority threatened; they feared that competent civilians would be given important positions in the navy yards. They knew that they must act at once. If the new scheme was given a fair trial they knew that the old con-

ditions would never return. The Newberry scheme was put into effect Feb. 1, 1909; the new secretary of the navy came in on March 4. Immediately every power was brought to bear on him and he succumbed. He fell entirely under the influence of these "fighting officers" who swarm around Washington. It was given out in a very short time that the new scheme was not producing results and was a mistake. How absurd this is to a business man. Everyone who knows anything of industrial management knows that a radical change involving large physical changes in shops and important changes in organization require many months to show real results. In the case of the naval administration of the navy yards, however, conditions were so bad that big cuts were immediately obtained in costs and these cuts in cost of doing work were the largest at those yards where the commandants allowed the Newberry scheme a fair show. It is known positively that the cost of doing certain work in some navy yard shops operating under the full benefit of the Newberry plan was cut in *halves and in quarters!* On one job the direct labor cost alone was reduced from \$1,200 to \$400 in less than three months after the Newberry plant went into effect! But this enormous increase in efficiency was not to be let stand.

Adding to the Red Tape.

In a few weeks even some changes were made in the Newberry scheme, enlarging the powers of the inspectors and adding to the red tape. It was, however, on July 1, 1909—only five months after the Newberry scheme was put into effect—that the first large so-called "improvement" was made in Mr. Newberry's methods. I will not trespass upon your space for the publication of the entire order, though it is very amusing reading to a business man. I will, however, give a few extracts. Mr. Newberry had in effect done away with the bureau system. He concentrated the responsibility for the designing, building and repairing of ships in one bureau; the Bureau of Construction and Repair. It was well known that it was Mr. Newberry's intention to make this a grand engineering department with competent constructors and engineers directing all operations. He fixed absolutely the responsibility in one head. The other bureaus were retained because they could not be abolished except by act of Congress, but their duties were made entirely advisory. Mr. Meyer re-established the bureaus on their old mischievous footing.

The crowning achievement of Meyer, however, was the so called "improvement" at the navy yards. Under the

Newberry scheme, there was one manufacturing department under the control of a naval constructor as manager. The naval constructors are officers selected from the line soon after they leave the naval academy. They are then given a post graduate course in engineering and shipbuilding at the best technical schools in the world and their service is at the navy yards and the private shipyards. They are certainly the best fitted officers in the navy to manage the industrial navy yards. Some of the constructors have made excellent reputations as engineers and shipbuilders and a number have left the service to accept important positions at high salaries in some of the large private establishments. The naval constructor-managers were surrounded by line officers who were supposed to see that the work was done properly.

Meyer's Crowning Achievement.

On July 1, the following order was issued by Mr. Meyer: "When orders for work under the Bureau of Steam Engineering are received from the Department or when such work is authorized by the commandant, the inspector of machinery will, with the approval of the commandant, indicate the labor, tools and material to be furnished by the manager. This labor, tools and material will then be under the full control of the inspector of machinery and he becomes responsible for the direct cost and correct execution of the work ordered."

Who could have devised such an order? Probably one of the admirals, who is now designated as an "aide" to the secretary of the navy. Perhaps it was the admiral who, as an aide to the secretary, is to direct the industrial work of the navy. It surely reads as if it were written by an admiral, but an apprentice boy in one of the shops he controlled could have told him that it is an absurdity—an impossibility. No sane business man, familiar with shop management, would have permitted such an order to be issued.

Outlining the Situation.

Here is the situation: A manager in full control of the shops of the navy yard with a complete organization of superintendents and foremen. A large amount of work is authorized on a ship at the yard and the inspector of machinery is to designate the tools, labor and material required. When is he to do this? If a drill press is needed, is the work to wait until the inspector designates the machine to the manager? Are these machines designated to be used for no other purpose than the work under the inspector of machinery? The laborers are under the full control of the inspector after he has designated

them. What a situation! What an awful mess of shop discipline and organization results! The manager fixes the wages, of the men, advances them, discharges them, reduces them, but yet while on this particular bit of drilling or whatever it may be, they are under the "full control" of the inspector! The men are subject to the manager's regulations for part of the day and then are under the orders and regulations of the inspector for the remainder of the day. But what about the superintendents and foremen? They must take orders and instructions from two sources and it is needless to say that these orders are not harmonious. They could not be under such regulations. Who but a crazy man would permit such a division of authority and destruction of discipline in any commercial shop?

It will be noted that the inspector is responsible for the *direct* cost of the work, while the manager is responsible for the indirect cost. If the manager by additional supervision or better tools or devices reduces the direct cost, the inspector claims the credit and exclaims against the high indirect costs. If on the other hand the inspector is taken to task for high direct costs, he claims that lack of proper tools or supervision was the cause. This is the navy way—arrange it somehow so there will be no responsibility; fix it up so that when there is trouble all can escape by putting it on the other fellow.

The Wonderful Swift Board.

The great improvement (?) on the Newberry scheme, which is outlined above, continued from July 1, 1909, to Dec. 1, 1909. During this period the wonderful Swift board was in session. This board was composed *entirely of line officers* who knew nothing of industrial management; yet this board, on which the only branch of the naval service that is skilled at all in engineering and shop management was not represented by even a single individual, was charged with the duty of proposing regulations for the organization and management of navy yards! There were various rumors that great changes would take place as a result of the deliberations of the Swift board. Those who had their ears to the ground were told that it was fixed for the line—that there would be plenty of soft shore berths for the line officers and then, when the scheme was working, a demand would be made on Congress for more officers and that the increase would be in the higher grades which would provide promotion for everybody. It was a sure tip. It has all come to pass and the line officers are flooding the navy yards. From *four to eight* additional officers have been ordered to the manufacturing

department in each navy yard and the cost is not less than \$30,000 additional each year in salaries, without one iota of increase in the amount of work done at the yard or in its efficiency.

Are Not Even Amateur Engineers.

The public has been told how officers, trained as sea going engineers, must control the machinery work in the navy yards. Examine the records of the officers recently ordered to the yards and it will be seen that they are not even amateur engineers. They are mostly commanders and lieutenants, lately commanding some of our antiquated gun boats or small torpedo boats. They hardly know what the inside of a shop looks like and as for management, they don't know what the word means in an industrial sense.

The writer recently visited one of the navy yards to find out for himself and spent several days, meeting a number of the new officers. They are clean cut youngsters who no doubt can do very well as watch officers or commanding officers of torpedo boats, but they know absolutely nothing about the jobs they are now in. They are not even trained as marine engineers, as an officer is now called in the navy if he has served a few months in the engine room. These officers are to manage large shops and large bodies of men, with pay rolls amounting to millions each year. I believe that many of these officers know that they are out of place and would like to get out of the job, but they must never say so—it is the line policy to grab all the shore stations possible. It seems as if the next step is now to be taken and Congress is to be told that the battle ships cannot go to sea unless additional officers are provided in the higher grades. What a game; more soft snaps ashore, more officers in the higher grades, promotion for all and more millions of the people's money wasted!

Is Congress Seeing Through the Game?

Can it be possible that Congress is to be fooled again? There are signs that Congress is beginning to see through the game. Look deeper, Mr. Congressman; take the lid off; let the people who know, tell; make them tell; the writer has knowledge that there are officers in the navy who know just how rotten the situation is in the navy yards. Make these men tell; order an investigation by joint resolution. Call navy yard officers and cross examine them. Employ competent engineers and shipbuilders from civil life to go into the navy yards and investigate and report what they find. If this is done, every semblance of military control of navy yards will be torn out by the roots and ef-

Grand Trunk Pacific's Steamer Prince Rupert

ficient administration cannot be obtained until this is done.

But are Congress and the people to be fooled into deferring such an investigation by the new Meyer reorganization? Certainly not, if they will go to the navy yards and see the working of the scheme.

It has been advertised that under the new regime there are two grand departments in each yard, one hull and one machinery with the commandant as general manager. In reality there are *three* departments, for in addition to the two mentioned there is the one presided over by the captain of the yard. He has no labor roll but gets his labor from the hull and machinery divisions and then such labor is entirely under his control. It is the old story of mixed responsibility, conflicting authority and rotten yard discipline over again. This department controls all buildings, yard repairs, railways, teams, methods of transportation, cranes, shears, roads, grounds, etc. Now see how it works: If a machinery division foreman wishes to handle a heavy weight and needs a crane, permission to use the crane is asked of the captain of the yard and he in turn then asks the machinery division for a man to run the crane and finally the hull division is asked to furnish laborers to do the handling. And this parades under the name of organization and shop management. Again, if a hull division foreman requires some machine work, request is made of the engineer officer and he then orders the foreman of the machine shop, and so on—I tried to follow this maze of red tape in one of the yards, but it was too much for me, I could not untangle it. Is it any wonder that under such a system efficient foremen and competent workmen who are used to doing things and accomplishing results give up in disgust, quit the navy yards and hunt for other jobs?

These are only samples of the wonderful reorganization scheme. Could anything else be expected under present conditions? The navy is bound to red tape. The more tape the more officers are required to unwind it. But in the meantime what are Congress and the people going to do about it? Now is the time to act. Make the investigation thorough. Clean out every navy yard officer who does not know his business, who cannot produce results, and chase him off to sea. Then if there are not enough officers left, hire competent civilians and educate men to properly administer the navy yards. If this is done, enough money will be saved to build another navy, with plenty left over to assist in building up the merchant marine which is the backbone of both trade and navy.

ENGINEER.

New York, Feb. 4, 1910.

ON Monday afternoon, Dec. 13, a large company of ladies and gentlemen assembled at the Wallsend shipyard of Messrs. Swan, Hunter & Wiggin Richardson, Ltd., the occasion being the launch of the passenger steamer Prince Rupert. Mrs. Richard L. Newman, of Victoria, British Columbia, acted as sponsor. The Prince Rupert is being built to the order of the Grand Trunk Pacific Railway Co., of Canada. R. L. Newman is superintending the building of both this vessel and another similar one in the same shipyard. These steamers will inaugurate a new and most important service between Prince Rupert, which is the western terminus of the Grand Trunk Pacific Railway, and Vancouver, and thence to Victoria at the southern end of Vancouver Island, and onwards to Seattle or Tacoma. This route, some 750 miles long, lies entirely among the islands of the coast of British Columbia. The passage will prove very popular among tourists, for it is extremely interesting and picturesque, and one which for wild grandeur excels almost anything to be found in the world from the deck of a sea-going ship. The town Prince Rupert, which is still an infant city, is in the same latitude as London and has a climate with a temperature much the same as that of the metropolis of the British Isles. The selection of the site of Prince Rupert was a most important task. It was necessary to have a harbor second to none, and many other places were carefully surveyed before the final decision was made. Prince Rupert lies in a magnificent situation in a land-locked harbor of immense size, having a waterway a mile wide. Travelers going by the Grand Trunk Pacific railway to Prince Rupert will find this route the shortest from the west to Yokohama, effecting a saving of as much as two days when compared with the older route via San Francisco. Again, the distance from Prince Rupert to Yokohama is nearly 500 miles less than the passage from Vancouver to the same port. Another important point in selecting Prince Rupert lies in the fact that the maximum gradients over the Rocky Mountains will be very much less than other railways. The route goes by the Yellowhead Pass, the maximum gradient for eastbound traffic being only 21 feet

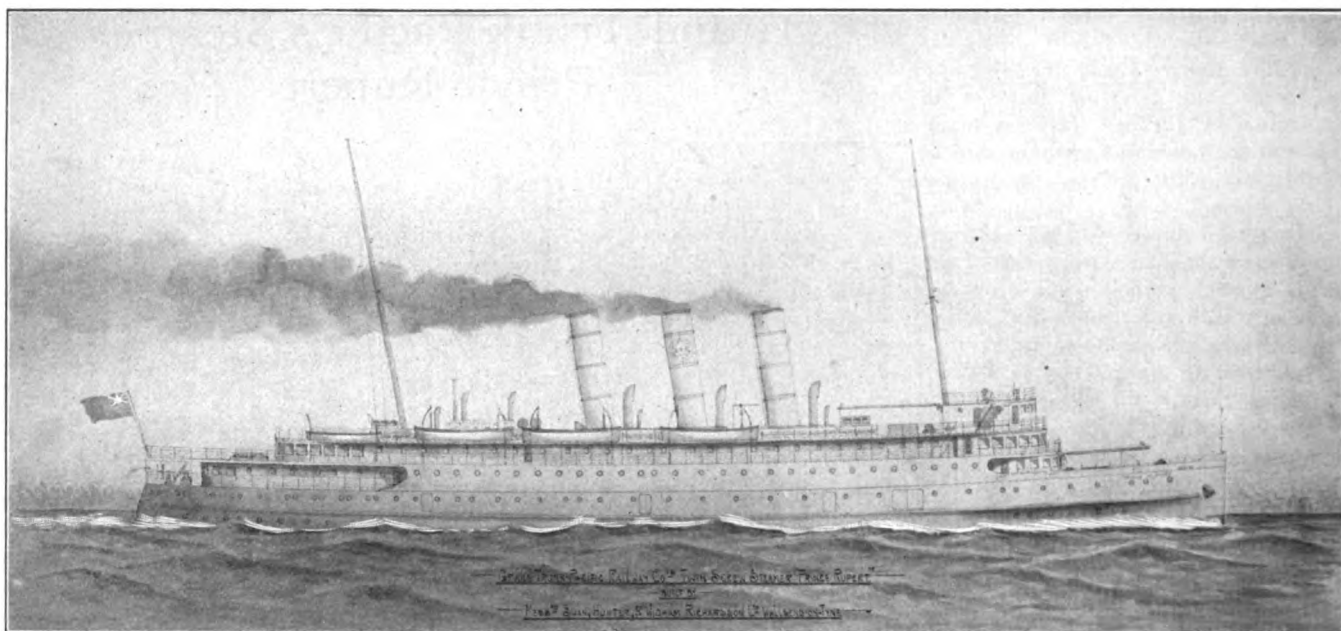
per mile, with one summit 3,700 feet to be negotiated. Compared with this is another trunk line further south which has to pass over two summits rising up to 5,300 feet, with a maximum gradient of not less than 237 feet per mile.

The steamship Prince Rupert has been carefully designed to meet the requirements of the service in question. The steamer will have a smart appearance with its straight stem and cruiser stern. There will be two pole masts and three funnels. The steamer is designed for a speed of 17 knots. The principal dimensions of the Prince Rupert are: 320 feet overall in length, 42 feet 2 inches in breadth with a depth of 18 feet to the main deck. The ship is being built to the highest class under the British Corporation survey and will also comply with the Board of Trade regulations for passenger steamers. The gross tonnage of the vessel is 2,850. The engines and boilers with Howden's forced draft are being constructed by the Wallsend Slipway & Engineering Co., Ltd. The former consist of two sets of triple expansion engines, balanced on the Yarrow, Schlick & Tweedy system.

On the shelter and shade decks of the Prince Rupert, there is accommodation in staterooms of two berths each for about 220 first class passengers. There will also be a few sets of staterooms en suite placed on the shelter deck amidships. Second class passengers will be carried on the main deck forward. When occasion arises, about 1,500 excursionists can be taken on board.

The dining saloon on the main deck is placed at the extreme after end of the vessel. The rounded shape of the cruiser stern makes an extremely handsome room, which will be furnished and panelled in oak. Instead of having large tables there will be several small ones placed in bays. Immediately forward of the dining saloon are the stewards' pantries and the kitchens.

At the after end of the shade deck will be a handsome smokers room for first class passengers, panelled in fumed oak. The second class smokers room is placed at the forward end of the shelter deck. There will be special accommodation for ladies in the shape of a music room which will be daintily furnished in light colors, the



PRINCE RUPERT, OF THE GRAND TRUNK PACIFIC RAILWAY.

painting being white enamel. The main staircase of the ship will be a notable feature, the panelling of the walls being in white enamel and the balustrades of wrought iron elegantly designed. The promenade on the shade and boat decks will be spacious. On the shade deck forward of the funnels is the observation room, panelled in maple and sycamore. This room will be specially lofty and well lighted by very large square windows, allowing passengers to have

an uninterrupted view of the scenery en route. The cabins in all the deck-houses will have wide rectangular sliding windows provided with jalousie screens. The Prince Rupert will be provided with a wireless telegraph installation, refrigerating machinery for ship's stores and dairy produce, electric light and steam heating throughout. The rudder is of the balanced type wholly below the waterline and will be actuated by a telemotor steering gear.

sacrifices made. The under-water boat, to-day, is a sort of submarine ambush, and her effectiveness when once submerged is limited largely to awaiting an enemy's approach within her own zone of hidden activity. She is strictly speaking a moveable torpedo battery, and her duties are in no sense to be confused with the purely aggressive service expected of the high-speed surface torpedo-boat.

A submersible capable of making 15 knots an hour is a craft which may operate far to seaward and over wide areas in conjunction with the armored fleet, and in this way can serve the double purpose of a dirigible mine field or the stricter defensive function of harbor protection. In this greater adaptability the submersible shows the advance over the submarine. Our own coastal conditions demand submersibles rather than submarines, and vessels of this sort will be still more valuable when naval protection is required for the Panama canal.

One of the conditions under which the Hvalen was built prescribed that the vessel should be able to run under her own power, unescorted, from Spezia to Stockholm—a total distance of quite 3,500 knots. The longest single run was from Spezia to Cartagena, a distance of 790 miles; and this was accomplished in 72 hours—the boat using only her central screw. During the Hvalen's long trip she encountered a good deal of stormy weather, and yet her commanding officer has spoken in terms of the highest praise of the manner in which the little vessel went steadily on

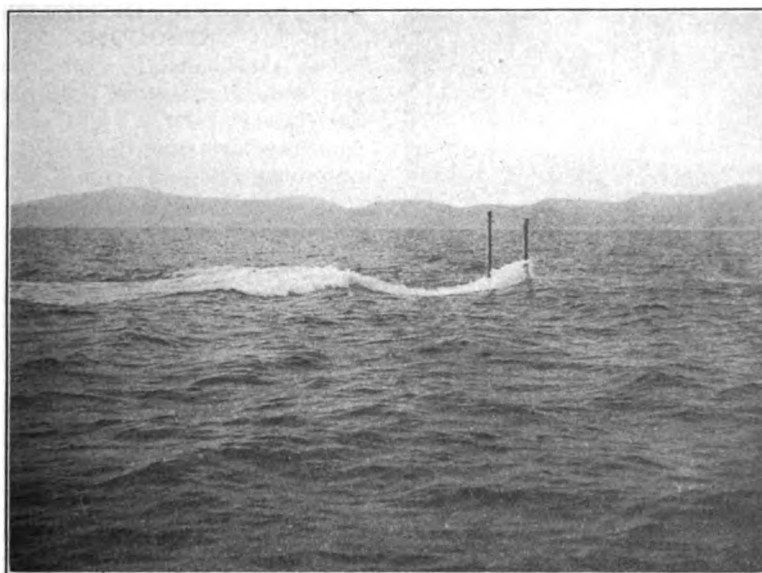
Submersible Boat Hvalen

THE submersible "Thrasher," building at Cramp's shipyard in Philadelphia, is the first reproduction in this country of the Laurenti type of under-water craft which have given so much satisfaction in the Italian navy and elsewhere in Europe. On this account, we have reason to be interested in the recent performances of two other Laurenti submersibles recently added to the navies of two Scandinavian countries. The records of these vessels can be taken as a fair index of what may be expected of the Thrasher.

The Hvalen, built for Sweden, is a boat of only 230-tons submerged displacement, and in cruising trim has a reserve of buoyancy of about 60 per cent of her surface displacement. She has a shipshaped form of hull—in contradistinction to the cigar-like body of the submarine, and, in conjunction with her great reserve of buoyancy, embodies those prime essentials where-

in the submersible differs from the submarine according to the definition of Monsieur Laubeuf, the French originator of the submersible. The Hvalen has made 15.2 knots on the surface, and submerged has an endurance of three hours at a speed of 7 nautical miles. Unlike any other type of under-water craft, these Laurenti boats are driven by triple screws, and this arrangement affords a very desirable flexibility of motive power combined with economy.

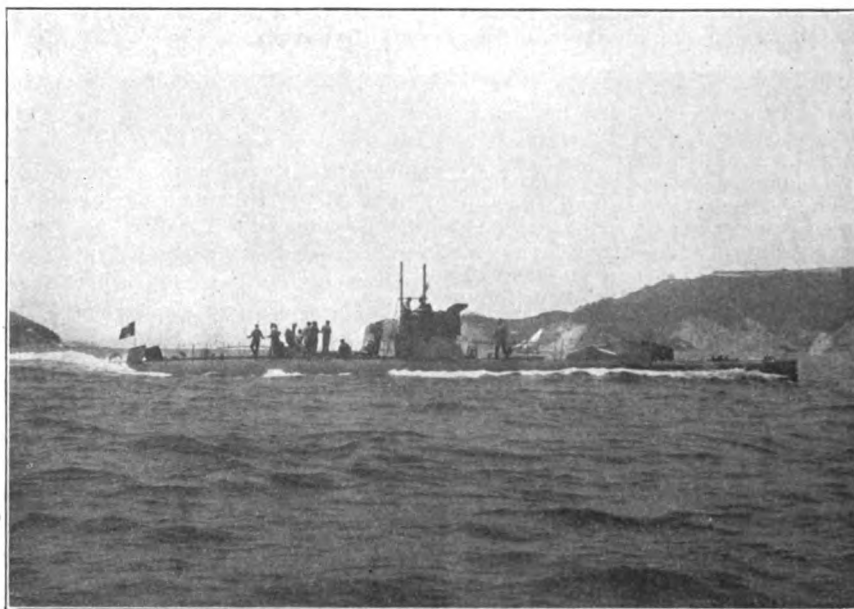
Aboard, surface speed is deemed more important than a corresponding increase of submerged speed; and, associated with seaworthiness, is the means by which the submersible can cover rapidly considerable distances between their bases and the field of their offensive usefulness. High speed submerged is obtained only by surrendering a large measure of surface mobility; and the gain in submerged speed is not commensurate with the



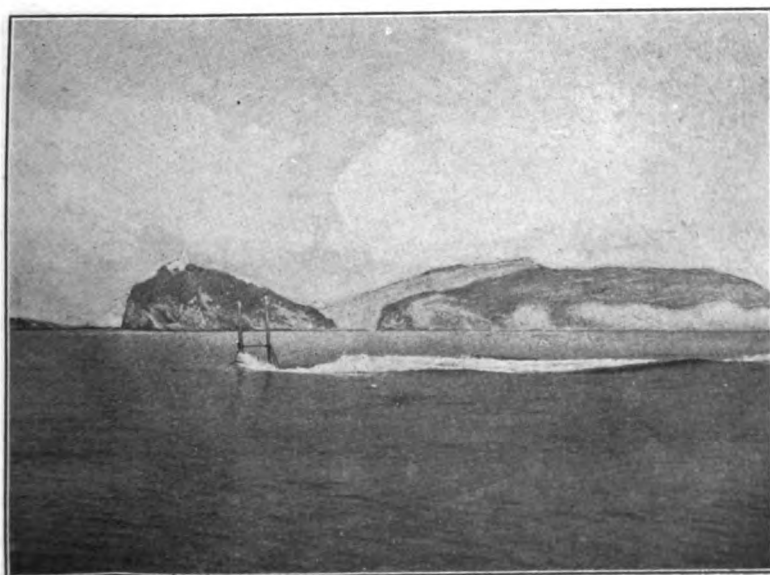
HVALEN, FULL SPEED SUBMERGED. COURSE PERFECTLY HORIZONTAL.

The little map gives a graphic idea of the nature of the journey.

Since her delivery to the Swedish government, she has been put through further trials. One of these constituted a two-hour, full-speed submerged run, and during that time she described circles, made turns and figure-eights, yet at no time did her depth vary more than 10 centimetres (about 4 inches). The photographs of the Hvalen running submerged show that she is able to keep an even keel; and in diving from the surface her change of trim does not exceed a maximum of three degrees at any time. It shows that boats of this sort—even of goodly length—can operate safely in moderate depths of water, and should the diving-steersman be inattentive there is no danger, even at high speeds, of the Laurenti boats plunging to a dangerous depth. The Swedish government



SWEDISH SUBMERSIBLE HVALEN AT FULL SPEED, 15.2 KNOTS.

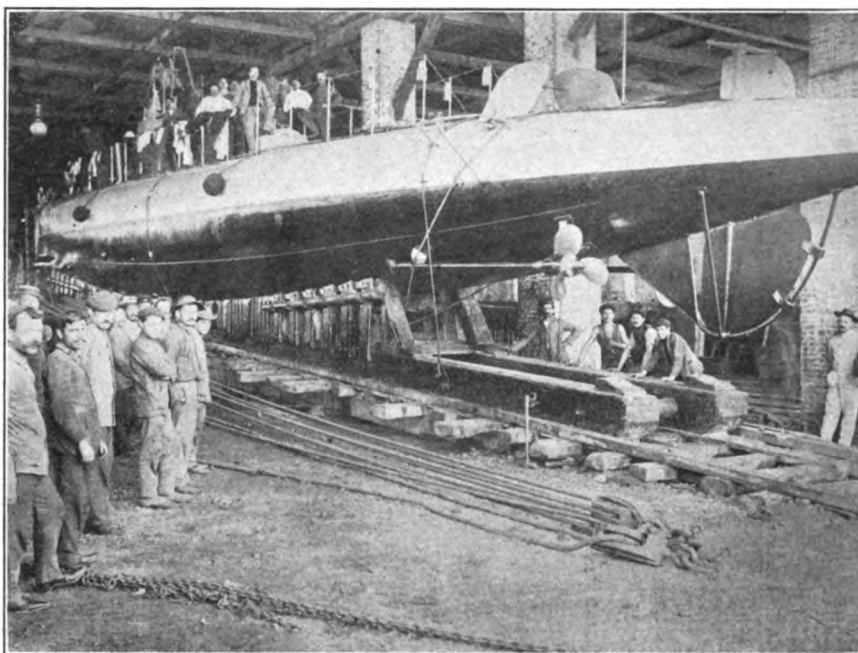
HVALEN, DIVING ANGLE ABOUT $2\frac{1}{2}$ DEGREES.

has been so pleased with the Hvalen that three more submersibles have been ordered from the Fiat-San Giorgio of Spezia.

The Dykkeren, built for the Danish government, is an all-electrical submersible, and is designed to meet special local conditions. Her batteries are charged from either another ship or a shore station. She has a submerged displacement of only 130 tons—about the same as that of our own submarines of the Adder class. By the contract, she was required to make 11 knots on the surface and 7 knots submerged; but her builders obtained 12.02 knots light and 8.1 knot under water. Since the Dykkeren's delivery, she has been used continually in training crews, and the following account by a naval officer will give some idea

of how well the little craft can be handled and show, too, her possible usefulness in attacking an anchored armored.

"The 'Olfert Fischer' was lying up in the sound guarded by three torpedo boats. The day was clear with a fresh easterly wind breaking the water's surface. The submarine was expected and everyone on deck was alert. Notwithstanding this careful watch and the frequent use of field glasses, the Dykkeren was able to get unobserved within 300 metres of the ship and directly on her starboard broadside. It was not until the Dykkeren came to the surface and blew her whistle that anyone on the four watching vessels knew that she was anywhere near. For the greater part of her approach the Dykkeren kept her periscope under water, and brought it to the surface only once in a while to check her course. After this run, the Dykkeren made excellent torpedo practice at



DANISH SUBMERSIBLE DYKKEREN.

ranges from 800 to 1,500 metres and while running at different speeds submerged. A little later, the boat had a six-hour under-water run, during which she maintained a uniform depth of four metres, and held this depth except during momentary inattention on the part of the man at the diving rudder, and then altered depth about a metre and a half. Three different men controlled in turn the submerging rudders—each officiating in half-hour periods."

During the past year, the Italian government sent its submersibles out for special maneuvers. They were kept at sea for a period of more than a month—having no touch with the land during that time, and their mobile operative base was the mother-ship, Lombardia. None of these vessels had a greater displacement than that of 214 tons submerged, and this sea-keeping performance is both significant and exceptionally creditable.

The accompanying picture of the Dykkeren just before launching gives a good idea of the form of hull peculiar to the Laurenti boats. To submerge, the superstructure ports are opened, and the space fills freely with water as the craft trims deeper owing to the admission of water into her bottom ballast tanks. When the boat comes to the surface after a submerged run, the superstructure frees itself automatically, and no pumps or other mechanical means are required to handle this mass of water. This is a prime military advantage; because it makes it possible to give the vessel a surface factor of safety of great buoyancy, and yet does not

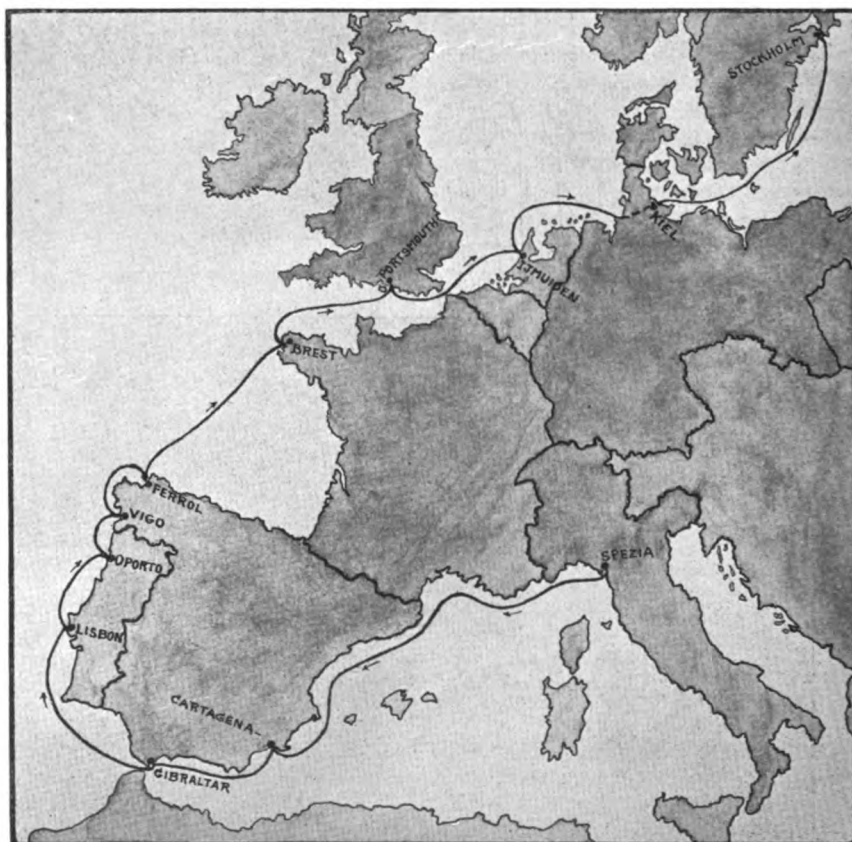
retard hasty submergence upon the approach of a foe. The Italian government has given further evidence of approval by ordering eight more Laurenti submersibles. The new boats will have a submerged displacement of nearly 300 tons and will be propelled on the surface by means of heavy-oil engines.

SHIP BUILDING IN THE UNITED KINGDOM.

The ship building returns for last year show that exclusive of war ships 526 vessels of 991,068 tons gross were launched in the United Kingdom, while the war ships launched at both government and private yards numbered 42 of 126,230 tons displacement. The total output for the United Kingdom was 568 vessels, of 1,117,296 tons. The mercantile tonnage showed an increase of 61,397 tons but is the lowest total for 12 years, with the exception of 1908. British colonies were the best customers for the ships, ordering 70 vessels of 60,072 tons or 6 per cent of the total output.

A comparison of the output in the United Kingdom and abroad, shows that a considerable decrease as compared with the 1908 figures is recorded in the case of nearly every country, and is especially noticeable in France (over 49 per cent), Germany (nearly 40 per cent), and the United States (over 31 per cent). On the other hand, the tonnage launched in the United Kingdom shows an advance of 61,397 tons (or 6.6 per cent), on the output for 1908.

Roy M. Wolvin has resigned as manager of the Wolvin lines to devote his attention to the package freight trade in which he is interested.



THE RECORD-MAKING CRUISE OF THE HVALEN FROM SPEZIA TO STOCKHOLM.

Lake Carriers' Association



President Livingstone, of the Lake Carriers' Ass'n.

THE third week in January is annually becoming more important to lake vessel interests. During that week the Great Lakes Protective Association, the Lake Carriers' Association and the

Lumber Carriers' Association held their annual meetings in Detroit.

Especially important was the meeting of the Great Lakes Protective Association. This association was organized at a meeting of the Lake Carriers' Association a year ago and was formed especially to carry partial insurance upon the fleet. Vessel accidents have been so numerous that underwriters were beginning to regard the trade with distrust and some of the leading companies were actually withdrawing from the field. It became imperative that some concerted effort should be made to minimize the number of accidents, and especially to avoid those caused by the desire to take advantage of the last inch of draught.

J. S. Ashley was the leader in this movement and to him the success of the association is largely due. Partial losses were considerably reduced, though total losses in the concluding week of navigation were unfortunately heavy. The work of the association is well set forth in Mr. Ashley's report, of which the following is an excerpt:

It was but a few years ago that the vessel tonnage upon the great lakes, composed entirely or nearly so of wooden vessels, was called upon to pay a premium of but 2½ per cent for their insurance. The metal ship has been in existence but a comparatively few years, during which time large sums of money have been expended by the government for the improvement of the channels and establishment and maintenance of aids to navigation. Notwithstanding the fact that these metal vessels are not as liable to total loss as were their predecessors, the wooden vessels, and that their insurance constitutes a much larger volume of business, the rates of insurance premiums have gradually been advanced until at the present time the owner of vessel property is paying the almost prohibitory tariff of 5½ per cent for insurance.

The rates have been advanced from year to year and with each advance the underwriters have stated and reiterated the statement that they were not only unable to make a fair profit in their business, but were actually losing money in accepting risks at the rates prevailing prior to each increase. The rate of 5 per cent prevailed in 1907. In 1908, although the rate was not advanced, the cost of insurance was actually increased about 10 per cent by reason of the change in the method of arriving at the straight hull valuation.

This increase in the cost of insurance caused a great deal of discussion among the vessel owners during the season of 1908, and at a meeting in Detroit on Oct. 28 the matter crystallized into a formal consideration of the question of ways and means to bring about a reduction of the premiums.

themselves a percentage of the insurance of the vessels had been examined by Mr. Harvey D. Goulder, who stated that such a proceeding was perfectly legitimate and expressed the opinion that a plan of operation was entirely feasible. The matter was then taken under consideration and subsequently a general call was issued to the vessel men of the great lakes for a meeting to be held in Detroit on Jan. 18, 1909. This call was responded to by a very large and representative number of vessel owners on the great lakes, together with representatives of the underwriters and trust companies.

At this meeting after a very comprehensive discussion of the subject in all its phases it was the unanimously expressed opinion that the largest item of expense in the operation of ships on the great lakes is the cost of repairs by reason of accident, resulting in the rate of premium on hull insurance



MR. J. S. ASHLEY,

The leader in the movement to reduce insurance premiums on the lakes.

The unanimously expressed opinion of those present at this meeting was that it was highly desirable that some action should be taken with this end in view and that there should be concerted effort on the part of the vessel interests to reduce vessel losses to a minimum by some method of regulation.

The legality of forming a co-insurance society among the vessel men with a view of taking upon

have been increased until it has reached a point where its cost makes it nearly prohibitory; that regardless of whether the vessel is or is not insured the vessel owner himself must pay the entire cost of repairs and that every vessel owner of insured property participates in the losses of every other insurer.

Those present were also of the unanimous opinion that, inasmuch as the underwriter must from the

premiums make restitution for losses, any action which would diminish the amount of losses would ultimately reduce the rate of premium, and that united movement, with this end in view, should be undertaken.

An advisory committee was elected and a tentative plan embodying a system of inter-insurance was presented, which after a full and free discussion was adopted subject to certain decisions referred to the advisory committee for their consideration.

So favorably was this plan received by those present at the conference that at the conclusion of the meeting vessel tonnage to the valuation of approximately \$60,000,000 was enrolled for insurance under this co-operative plan. It was afterwards increased until practically all of the coarse freight tonnage on the great lakes was enrolled in the association to a value approximating \$80,000,000.

At a meeting of the leading American underwriters in New York, where the matter was explained, your committee was assured of their hearty active co-operation and were further promised that they would use all their influence in England and believed that the foreign underwriters would take the same view and interest. Your committee was informed by the underwriters that there had been talk of increasing the rates because although the rates had been so high the losses have been so great that even with these high rates the business did not pay. They highly recommended this plan, promising to co-operate with it, and expressed the belief that it was the first plan that promised relief, and that the owners, masters, and underwriters co-operating along these conservative lines without anything radical being attempted it could not fail in their judgment to work a large reduction in losses and so a large reduction in insurance rates. There is no question that to the efforts of these gentlemen with the foreign underwriters is due the fact that the rates for straight hull insurance were not advanced from 5 to 6 per cent for the season of 1909.

The plan was subsequently presented at a meeting of the masters in Cleveland and upon their understanding of the arrangement there was nothing but expression of hearty approval of the plan by the masters.

The manner in which this plan has been received by all interests has been a source of much gratification to your committee and from evidence it appears that a way has been found to better conditions, reduce losses and work the greatest economy in operation of our ships of any single movement that has ever been attempted in the business. The experience your committee obtained during the past season has been of incalculable benefit to them and although there remains much still to be accomplished there is no question in our minds that continued effort along the lines we have been pursuing

will eventually accomplish the results which the association was established for.

At a meeting of the advisory committee held Feb. 1 and 2, 1909, it was decided that this association would assume 5 per cent of the insurance valuation of the vessels interested in the membership of the association, which percentage it was considered would be sufficient to enable the association to establish such regulation and supervision of navigation as would tend to reduce losses and to secure all the necessary data upon which to base a knowledge of the cost of insurance.

An attorney-in-fact was elected at this meeting. Copies of the adopted plan together with power of attorney were prepared and distributed to vessel owners for execution.

Sub-committee was appointed to undertake the drafting of rules for the regulation of navigation and at a subsequent meeting of the advisory committee (Feb. 15), the rules proposed by this sub-committee were approved and adopted. These rules were printed in vest pocket form and also upon large placards for posting upon the vessels of the association.

The approval and co-operation of the Lake Carriers' Association in the enforcement of these rules was solicited and on Feb. 19, President William Livingstone, of that association, appointed the following committee to act in conjunction with the advisory committee of our association: H. Coulby, Capt. John Mitchell, Capt. D. Sullivan, Capt. W. C. Richardson, E. T. Douglass and William Livingstone.

The membership, tonnage and valuation of the Great Lakes Protective Association is as follows:

	Gross Tons.
336 Iron, composite and steel steamers	1,445,504.92
9 Steel Barges	24,920.90
6 Wood Barges	12,837.00
19 Wood Steamers	34,763.00
370 Vessels	1,518,025.89
1 Wood barge not covered by our policy	2,073.00
3 Wood steamers not covered by our policy	6,152.00
374 Vessels	1,526,250.89
Total insurance on 370 vessels covered by our policies	\$79,049,780.00
Great Lakes Protective Association insurance on these 370 vessels	\$3,952,482.00
Total tonnage of 370 vessels covered by our policies	1,518,025.89
Tonnage of three vessels, total loss:	
Ottawa	2,431
Falcon	865
Rome	1,847
	5,143.00

Total tonnage of 367 vessels now covered by G. L. P. A. policies	1,512,882.89
Number of vessels covered by insurance ..	367
Number of vessels in associate membership ..	72
Total	439

A. A. Wright, president of the Dominion Marine Association, in discussing the subject said that insurance rates could only be brought down by the united action of vessel owners. The present rate to Lake Ontario is 6 per cent and to Montreal 7 per cent. He added that two-thirds of the

premiums paid on the insurance on these ships has remained in the pockets of the underwriters. Incidentally he complained of the too sudden flooding of the Canadian lock at the Sault, saying that the valves are too large and that masters had difficulty in controlling their vessels. This complaint was something of a surprise, Chairman Ashley saying that he never heard anything of it.

Capt. D. Sullivan of Chicago said that from 60 to 70 per cent of the claims are for partial losses which are of an avoidable character. He stated that partial losses have been reduced about 40 per cent during the year, but were overbalanced by heavy total losses.

The membership of the Advisory Committee was increased from seven to eleven and now stands as follows: J. S. Ashley, chairman, D. Sullivan, J. H. Sheadle, H. S. Wilkinson, H. Coulby, W. C. Richardson, William Livingstone, W. H. Becker, C. L. Hutchinson, S. P. Shane and Francis King.

W. M. Mills of North Tonawanda thought that there should be classification of steel tonnage on the lakes, saying for instance that double-sided boats should have a lower premium than single-sided boats. Mr. Ashley replied that he thought that would be a pretty big problem for the association to tackle in its incipient stage, though he believed it to be desirable.

A vote of thanks was tendered to Mr. Ashley for his efforts in behalf of the association. In fact it is generally understood in the trade that Mr. Ashley practically devoted one-half of his time during the whole year to the affairs of this association and it was decided that during 1910 he should receive compensation for his services.

President Livingstone of the Lake Carriers' Association addressed the members on the necessity of additional lockage facilities at the Sault and especially urged the Canadian members to begin at once an agitation for a second lock on the Canadian side of St. Mary's river.

Lake Carriers' Association.

The annual meeting of the Lake Carriers' Association was held at the Cadillac Hotel on Thursday, Jan. 20. President William Livingstone in the chair. The entire forenoon was taken up in the reading of Mr. Livingstone's annual report, in which the work of the year was comprehensively reviewed. President Livingstone announced that a commission of government engineers had recommended the widening of the Livingstone channel



SOME OF THE LEADING FIGURES AT THE ANNUAL CONVENTION OF THE LAKE CARRIERS' ASSOCIATION.

in the lower Detroit river by 150 ft., making it 450 ft. in width. The straightening of the five-mile course in the Detroit river from Fighting Island to Amherstburg was recommended and a resolution was adopted asking congress to appropriate \$500,000 to the work.

Assurances were also received from the Canadian government that the Southeast Shoal lightship which has been maintained by the association would hereafter be maintained by the Dominion government.

Col. C. McD. Townsend, government engineer with headquarters at Detroit, addressed the members on the deep waterways of the lakes to the gulf which is so vigorously advocated in certain quarters. Lake vessel interests have never manifested much interest in this project. Col. Townsend declared that if the projectors had visions of the great steamers of the lakes carrying ore and grain to New Orleans and returning with oranges and lemons, they were indulging in the idlest of dreams. Even were it possible, he said, to dredge a 24-ft. waterway from Chicago to the gulf, the insurance rate upon a lake steamer would be absolutely prohibitive, so numerous would be the chances of accident in a stream 1,600 miles long, full of bends and cross currents. He thought, moreover, that such a waterway would be of no value to lake vessel interests but a positive detriment to the channels of the great lakes.

Turning his attention to the Sault he pointed out that owing to greater depth, the Canadian lock is now carrying a large share of the commerce, having increased from 6,000,000 to 27,000,000 tons in the past few years. He felt that the third lock when completed would be crowded to its utmost, owing to the greater draught which it will offer, and he urged that steps be taken to deepen the Poe lock. He also thought that two sets of gates should be located at each end, saying that the habit of vessels running up upon the gates of late had become a trifle monotonous. He also stated that the contractors complained that vessels approach too close to the dredges at work in the channels, and that the carrying away of buoys and lights is a common practice.

The following resolution, offered by G. A. Tomlinson of Duluth, was adopted:—"Resolved that the Lake Carriers' Association appreciates the earnest endeavor of its president in behalf of the efforts to secure the fourth lock at the American Sault and

that this association herewith expresses its unqualified endorsement of the project".

The discussion of the Welfare Plan occupied a large share of the proceedings. This plan was put into effect at the opening of navigation last year and has proved an unqualified success. Out of the total of 11,000 men employed on the steamers and barges of the association, 9,752 or nearly 90 per cent were enrolled in the Welfare Plan. This movement has as its cardinal object the betterment of working conditions aboard ships to the end that men of character may be attracted to the service with consequent increased efficiency. The plan involves a bureau of registration, each member holding a certificate which among other things entitles him to financial benefit in case of accident. Assembly rooms were established at a number of lake ports for the convenience of the men, the rooms being supplied with the usual appurtenances of club life.

J. H. Sheadle has taken great personal interest in this movement. In a little talk with the Carriers he declared that the leading thought was to get better men, as the work of the lakes was annually growing more complicated. As the greater part of the detail of the Welfare Plan was worked out by George A. Marr, secretary of the association, W. E. Lloyd of Buffalo and E. C. Collins of Cleveland, he called upon them for an account of the work.

Mr. Marr outlined the details of the work of the year in most comprehensive form, giving the number of years each man enrolled in the plan had served aboard lake ships, and the care that had been exercised to find the relatives of those who had been injured in service.

Mr. Lloyd described the progress of the plan in Buffalo, where it met with great hostility from the union, but finally triumphed. Mr. Collins outlined the many little conflicting problems that the committee had to face during the year. In conclusion Mr. Sheadle stated that eleven places are open this winter for the convenience of the men and that the sole thought of the projectors of the plan is to give everyone a fair deal.

Harvey D. Goulder, general counsel for the association, spoke without preparation but with fine eloquence upon the Sailors' Institute it is proposed to establish in Cleveland. The purpose is to found this institute entirely free from debt, from rent or interest-bearing charges and

to provide at actual cost, instruction in navigation and engineering. The institute will be supplied with all the apparatus of the technical school of the highest character and its corps of instructors will be the best obtainable. The purpose of it is to open the doors of opportunity to the young man who is determined to follow lake trade and to provide a home as well for those who may have become superannuated in service. About \$350,000 will be required for the institute, but the money has all been subscribed.

Mr. Goulder was followed by C. M. Heald of the Mutual Transit Co., of Buffalo, John Craig of Toledo, E. C. Collins of the Pittsburg Steamship Co., G. A. Tomlinson of Duluth, and C. E. Dyer of Pittsburg. Capt. John Mitchell, W. B. Davock, E. C. Collins, J. W. Prindiville, Arthur Hawgood, F. W. Smith and Arthur C. Sullivan were appointed as a nominating committee for the nomination of officers. It was decided to increase the board of directors from twenty-five to thirty and the following were elected: A. B. Wolvin, H. Coulby, J. H. Sheadle, S. P. Cranage, C. W. Elphicke, D. Sullivan, T. T. Morford, F. W. Smith, W. A. Hawgood, John Mitchell, William Livingstone, Edward Morton, H. D. Goulder, H. S. Wilkinson, G. A. Tomlinson, W. H. Becker, John Craig, F. W. Gilchrist, J. S. Ashley, W. H. McGean, C. D. Dyer, S. P. Shane, J. J. H. Brown, C. M. Heald, W. E. Lloyd, W. C. Richardson, W. M. Mills, A. F. Harvey and H. L. Shaw.

Before the board of directors retired for the election of officers the association instructed them to elect William Livingstone president. The following officers were elected: William Livingstone, president; J. H. Sheadle, vice-president; Harvey D. Goulder, general counsel; Capt. George P. McKay, treasurer; George A. Marr, secretary.

The executive committee consists of Messrs. H. Coulby, J. H. Sheadle, C. M. Heald, J. J. H. Brown, D. Sullivan, John Mitchell and S. P. Shane. The alternates are A. F. Harvey, W. C. Richardson, W. E. Lloyd, W. A. Hawgood, G. A. Tomlinson and J. S. Ashley.

The tonnage enrolled in the Lake Carriers' Association numbers 597 vessels of 2,017,273 gross tons, classified as follows: 451 steamers, 56 barges and 90 tugs, lighters and wreckers.

As legislation is contemplated to tax all corporations by their earnings, Mr. Goulder brought up the subject of uniform depreciation of ships. He felt

that if vessel owners decided upon some fair equitable percentage for depreciation and made it uniform that congress would be likely to allow it. He suggested that 7 per cent might be a fair rate.

The executive committee was instructed to prepare a resolution protesting against the building of a bridge over the Calumet river of less than 200 ft. width. A resolution was adopted asking the government to establish wireless telegraph stations on all life saving stations. A resolution was also adopted asking the government to maintain a light on Michigan Island. A light and fog signal station is also required on the outer breakwater at Sandusky, Mr. Ashley saying that it is badly needed. President Livingstone stated that he had already taken this subject up with the government engineer.

Upon motion of J. H. Sheadle a vote of thanks was given Supt. Sabin of the American canal and Supt. Ross of the Canadian canal for courtesies received throughout the year.

The annual dinner of the association was held at Hotel Cadillac on Thursday evening, Jan. 20. It was the most elaborate function of its kind that the association has yet given. The principal speaker was Congressman Denby, who addressed the members on the Panama canal, illustrating his lecture with numerous stereopticon slides. He was followed by Col. Townsend, A. C. Pessano, Rev. Dr. John H. Boyd, Major Charles Kellar and others. President Livingstone acted as toastmaster.

RECEIVERSHIP FOR GILCHRIST TRANSPORTATION CO.

Judge R. W. Tayler, of the federal court, has appointed S. P. Shane and Gen. George A. Garretson as receivers for the Gilchrist Transportation Co. upon the application of F. W. Gilchrist, vice president of the company. The Gilchrist Transportation Co. controls the second largest fleet on the lakes, numbering sixty-one in all, including thirty-two steel steamers, twenty-five wooden steamers and four barges.

This fleet was brought together a few years ago by J. C. Gilchrist, but during the past two years, owing to failing health, he has not been active in the affairs of the company, S. P. Shane being appointed as general manager to succeed him. The direct cause of the receivership was the inability of the company to meet a debt of \$300,000.

Judge Tayler has just authorized the receivers to issue certificates in

the sum of \$600,000 bearing 6 per cent interest, which, it is expected, will extinguish immediate obligations and provide a working capital of \$250,000.

The officers of the company are: F. M. Osborne, president, F. W. Gilchrist, vice president, S. P. Shane, general manager, C. L. Mosier, secretary and treasurer, H. P. McIntosh, Gen. Garretson and J. C. Wallace, directors.

PITTSBURG STEAMSHIP CO.'S ENGINEERS.

The annual meeting of the officials and engineers of the Pittsburg Steamship Co. and Pickands, Mather & Co., was held at the Hollenden on Feb. 2, 3, and 4. About 160 engineers were present. At the opening session the engineers were addressed by President Coulby, A. F. Harvey and F. B. Smith. This was the second annual meeting with the engineers though meetings have been held for several years past with masters. There is some talk of having masters and engineers meet together next season. At any rate this meeting of engineers was most successful, the engineers and officials of the company getting closer together than they have ever been. A most significant feature was the spontaneous regard shown for Mr. Coulby, three cheers being given for him at the conclusion of the meeting. Mr. Coulby left immediately after the meeting for Panama, as he is in need of a prolonged rest.

The appointments of the Pittsburg Steamship Co. and the Pickands, Mather Co. were announced as follows:

Pittsburg Steamship Co.

Steamer.	Engineer.
Baker.....	E. S. Stoddard.
Bessemer.....	H. Edmondson.
Black.....	R. Mastin.
Briton.....	Fred Beebe.
Buffington.....	John Dupont.
Bunsen.....	J. F. Walsh.
Cole.....	H. T. McLeod.
Colgate.....	J. A. Brickley.
Coralia.....	M. B. Sturtevant.
Corey.....	M. Toner.
Cornell.....	S. D. Graham.
Corona.....	Harry Flood.
Corsica.....	A. L. Roberts.
Cort.....	R. H. Richmond.
Crescent.....	A. E. Buddemeyer.
Dinky.....	A. J. Armonson.
Eads.....	William Dornbrook.
Edenborn.....	George H. Barth.
Ellwood.....	Floyd Lyons.
Empire City.....	J. Haggan.
Ericsson.....	John Mraz.
Fairbairn.....	Thomas Treleven.
Frick.....	S. W. Armstrong.
Fulton.....	William Densmore.
Gary.....	H. Dupont.
Gates.....	H. E. McIntosh.
German.....	W. D. Killett.
Gilbert.....	W. G. Tilton.
Griffin.....	James Goulding.
Harvard.....	J. H. Riggan.
Hill.....	L. L. Hinceline.
Houghton.....	William Bourlier.
Joliet.....	J. R. Marshall.
LaSalle.....	Urias Shoemaker.
Linn.....	James Dungan.
Lynch.....	A. L. Eggert.
McDougall.....	H. F. Schroeder.
Maliotoa.....	C. E. Lawrence.

Steamer.	Engineer.
Manola.....	H. W. Endelman.
Maricopa.....	I. H. McGlenn.
Marina.....	A. D. Birdsall.
Mariposa.....	H. M. Lubahn.
Mariska.....	A. W. Smith.
Maritana.....	W. C. McDougall.
Maruba.....	J. E. Sheldon.
Masaba.....	F. Limpert.
Mataafa.....	George R. Emrey.
Mather.....	George Treleven.
Matoa.....	J. M. Conroy.
Maunaloa.....	J. G. W. Coder.
Morgan.....	J. W. McEachren.
Morse.....	W. A. Marshall.
Murphy.....	George Arnold.
Neilson.....	James McKibbin.
Perkins.....	E. W. Fox.
Phipps.....	E. H. Learned.
Poe.....	Joseph Hasler.
Princeton.....	C. L. Birtrand.
Queen City.....	William P. Diamond.
Ream.....	F. J. Spencer.
Rensselaer.....	F. Schwartz.
Rockefeller.....	George Schroder.
Rogers.....	F. A. Smith.
Roman.....	Gus Johnson.
Saxon.....	R. W. Townsend.
Shaw.....	J. R. McRae.
Siemens.....	L. O. Willix.
Stephenson.....	L. H. Smith.
Superior City.....	H. B. Moore.
Van Hise.....	M. F. Sweeney.
Watt.....	John Skelly.
Wawatam.....	E. A. Brenner.
Widener.....	A. W. Armonson.
Zenith.....	H. N. Armstrong.
Schiller.....	Alx. McKenzie.
Morgan, Jr.....	A. Jackson.
Olcott.....	C. A. Fletcher.

Pickands, Mather & Co.

Samuel Mather.....	Edgar Arnold.
Amasa Stone.....	C. A. Heisner.
J. C. Morse.....	A. A. Mamon.
D. O. Mills.....	H. A. Woods.
Crete.....	F. A. Steadley.
Verona.....	G. A. Butler.
Odanah.....	James A. Southgate.
Adriatic.....	Herbert Kessel.
Elba.....	Aubrey Rivard.
Calumet.....	G. A. Brown.
Hemlock.....	P. F. Canniff.
Normania.....	Herman Falkerts.
Victory.....	Ray Arnold.
Pathfinder.....	George Arnold.

UNITED STATES TRANSPORTATION CO. APPOINTMENTS.

The United States Transportation Co. has announced the appointments of its masters and engineers as follows:

Steamer.	Captain.
John B. Cowle.....	R. J. Lyons.
Toledo boat.....	L. H. Driscoll.
A. E. Nettleton.....	Alex. Forbes.
John Dunn, Jr.....	W. D. Ames.
Harry Coulby.....	Z. Montague.
Lyman C. Smith.....	George W. Pierce.
J. E. Durston.....	William McAlpine.
Denmark.....	R. J. Walker.
Charles Hubbard.....	W. G. Rogers.
Smith Thompson.....	A. W. Stalker.
L. C. Smith.....	C. D. Woodward.
Hurlbut W. Smith.....	A. R. Beall.
William Nottingham.....	William Delany.
George B. Leonard.....	C. R. Ney.
Monroe C. Smith.....	Thomas McDougall.
B. Lyman Smith.....	B. W. Honner.
Wilbert L. Smith.....	J. N. Morrison.
Horace S. Wilkinson.....	John Robinson.
Charles M. Warner.....	James Johnson.
W. W. Brown.....	E. E. Carlton.
A. G. Brower.....	William Heller.
Steamer.	Engineer.
John B. Cowle.....	Andrew Haas.
Toledo Boat.....	E. D. Butler.
A. E. Nettleton.....	Thomas Reese.
John Dunn, Jr.....	Peter June.
Harry Coulby.....	George Nerriter.
Lyman C. Smith.....	L. F. DeMay.
Charles Hubbard.....	L. C. Klasen.
Smith Thompson.....	O. G. Schnyder.
J. F. Durston.....	Just Johnson.
Denmark.....	O. P. Stevenson.
L. C. Smith.....	H. O. Smith.
Hurlbut W. Smith.....	B. A. Ray.
William Nottingham.....	William Braden.
George B. Leonard.....	John Murnan.
Monroe C. Smith.....	Ed. Samson.
B. Lyman Smith.....	Charles B. Forgham.
Wilbert L. Smith.....	Charles Haas.
H. S. Wilkinson.....	Robert Haanan.
Charles M. Warner.....	Charles Keller.
W. W. Brown.....	W. H. Peterson.
A. G. Brower.....	Dan McDonald.

Success of the Deep Sounding Machine

TWO years ago, Capt. J. J. H. Brown, of Buffalo, installed a deep sounding machine on the steamer William H. Truesdale, the first of this kind to be introduced on the lakes. The Truesdale came out early in the season of 1908, which, as will be remembered by all shipmasters, was one of the worst seasons in the history of lake navigation, as a dense pall of smoke covered the lakes most of the season. Capt. George C. Stevenson used this sounder constantly, getting soundings in from 40 to 50 fathoms

Townsend, D. J. Morrell, George A. Flagg, R. S. Warner, Powell Stackhouse, L. C. Hanna, W. F. Fitch, Castalia, John Stanton, Andrew Carnegie, Henry W. Oliver, J. H. Sheadle, W. G. Mather, D. Z. Norton, Republic, H. M. Hanna, LaBelle, H. A. Berwind, Loftus Cuddy, G. A. Tomlinson, William E. Corey, W. D. Rees, Thomas Wilson, Yuma, John Dunn Jr., Thomas F. Cole, Cornell, H. C. Frick, Thomas Lynch, J. P. Morgan and Augustus B. Wolvin.

Capt. J. S. Woods, of the steamer J. E. Upson, who has been about the last man out in the fall and has usually run his last trip without lights, reports that the sounder has been invaluable to him in defining his position. He reports it also a great time saver in thick weather during the summer time as by taking soundings constantly it is unnecessary to check until the steamer's time is run out. Capt. Wood has taken soundings in 90 fathoms and feels that the sounder gives a sense of security that nothing else can give.

As an instance of its reliability Capt. Lyons, of the Sheadle, was ordered from Allouez Bay to Ashland, for ore. The weather was very thick, the steamer was light and in addition had a broken bucket, but Capt. Lyons left port and with the use of the sounder,

Capt. Lyons felt his course all the way around.

Every master, who has one of these sounding machines aboard his ship, has spoken in the highest terms of it.

Especially interesting is the following letter from Capt. Daniel Buie, of the steamer Capt. Thomas Wilson:

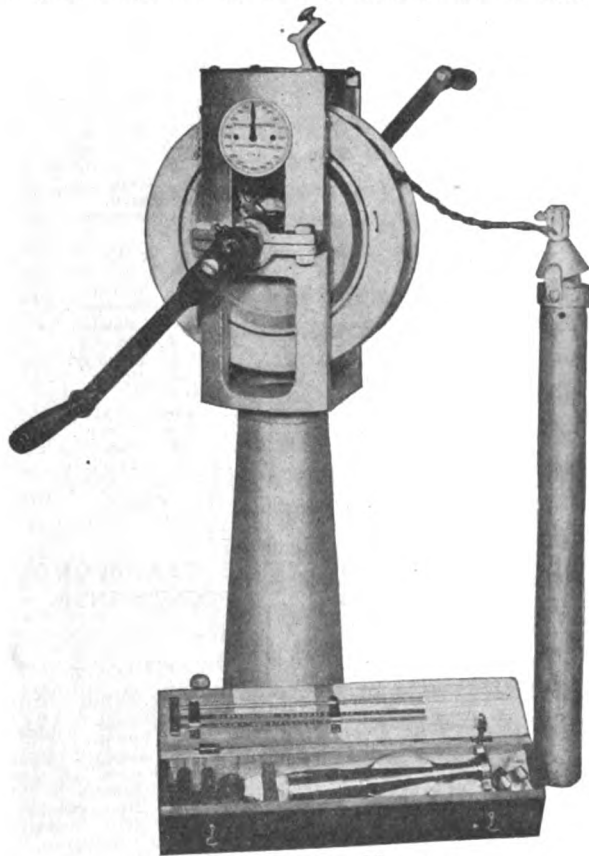
"It has been on my mind for some time to write you regarding the experience I had with the sounding machine put on the steamer Capt. Thomas Wilson, last summer. When the machine was put on the Wilson, I had but little faith in it. I looked on it as one of the fair weather playthings sometimes put on boats and quite useless in emergencies for purposes intended. True, we used it occasionally in fine weather

and got correct soundings, but when it came to real business, I used the hand lead. I now come to where I was converted to the use of the machine. The Wilson was on Lake Erie and in all of the storm, in which the great car ferry and the W. C. Richardson foundered and the Clarion burned. We were bound down without cargo from Duluth to Buffalo for coal. I never saw such a wild snow storm. It lasted from midnight Tuesday until Thursday, 5 p. m., and most of that time we could not see through it more than 500 ft. and never one-fourth of a mile. After running awhile, we had to depend on soundings and used the hand lead every 15 minutes. I usually handle the line myself when the lead is running out. The labor of hauling it in and preparing for another cast devolves on the mates and their men. Mariners only know what that means with a thermometer near zero—frozen lead line, a tub of brine to soak it in, benumbed fingers, profanity, etc., etc.

"The storm for a reasonable time was splendid, then it became monotonous. Finally we thought that such a prolonged manifestation of Divine power was open to criticism, as Mark Twain has said.

"After some hours' work with the hand lead I got very tired of it and asked the mate if he could work the machine. He replied that he could and it would be a d—d sight easier than this work. So I ordered him to use it and I would keep on with the hand lead and see how they compared. We did so and there was no difference in the depths given. The interests at stake were too large to take any chances, so we continued both methods of sounding until I was absolutely sure there could be no mistake and then I discontinued the hand lead. Sounding thereafter was comparatively a pastime. The machine was in a sheltered corner. No more frozen lines or benumbed fingers or use of a tub of brine, and other inconveniences.

"On Wednesday noon, the gale showing no signs of letting up, but rather increasing, I decided we were far enough down the lake. We had shoaled the water to 16 fathoms, so I let go both anchors with 75 fathoms of chain to each. The snow and gale lasted 30 hours longer. As we rode to anchor we would swing broadside to the sea, which at times would sweep over our deck. The holding ground was not reliable and therefore it was necessary to keep on sounding continuously the whole 30 hours we were at anchor, but



DEEP SOUNDING MACHINE.

while going 12 miles an hour, thus saving much valuable time. He says that the sounder never fouled, never gave the least trouble, and on more than one occasion kept him from stranding in thick weather. This sounder was also installed on the steamers J. J. H. Brown and J. E. Upson, built in 1908, and met with instant success.

Since that time its progress has been rapid. It is expected that the Pittsburg Steamship Co. will place it aboard all their first class steamers during the coming season and all the package freight lines are arranging to install it on their leading steamers. During 1909, the sounder was installed on the following lake steamers: A. C. Dinkey, E. J. Buffington, Isaac M. Scott, Edward Y.

with a sounding machine to do it there was no hardship for anybody and therefore no excuse for neglect.

"The storm ended at last and cleared up. We were anchored off Sturgeon Point and got to Buffalo O. K. Our crew decided the Wilson, a great ship and the forward end of the boat think a sounding machine once used, indispensable."

Capt. Buie declares that no person, who has used the machine, can conscientiously say that it is other than a good thing.

Capt. W. L. Sutherland, of the steamer Yuma, reports that he was enabled on one occasion to get bottom at 95 fathoms, running at 11 miles an hour. He considers the machine invaluable on any lake boat and is sure that its use would prevent many of the accidents on the lakes.

Capt. Neil Campbell, of the steamer H. C. Frick, also indorses the machine highly, saying, "It is very simple and easy to operate, gives you the exact sounding every time and running full speed. I tried the machine several times out in the lake and got the exact sounding on the chart, 40 fathoms was the deepest that I tried it in. I cannot find words to praise this sounding machine too highly. My opinion is that every ship should have one. One special result obtained I will mention. In running from Sheboygan to South Chicago, Dec. 28, 1909, in a blizzard of snow, I was greatly relieved of anxiety and worry as I kept track of the ship by my log and sounding machine, going full speed all the time until I checked down to anchor off Chicago."

Capt. C. H. Heaton, of the steamer John Stanton, says that he would not have it removed from his boat under any consideration. He says that he has experienced no trouble whatever in getting soundings at 50 and 60 fathoms when going full speed and that he repeatedly got soundings from 30 to 40 fathoms in 90 seconds, at full speed.

Capt. R. Jollie, of the steamer E. J. Buffington, says that he has found the machine most useful, saying: "We righted ourselves on two occasions in thick and foggy weather by using the machine. We found we were shoaling the water and hauled out until water deepened without any delay, the steamer going full speed all the time. Personally I would not be without the machine and am also of the opinion that all boats ought to have one."

Capt. J. H. Driscoll, of the steamer John Dunn Jr., regards the machine as the best safeguard that has been placed aboard his ship in several years and even adds that he would feel lost on a ship without one. He says that he has used it to good advantage in going along

the coast in thick weather, enabling him to navigate at full speed.

Capt. F. A. Bailey, of the steamer Thomas F. Cole, says: "I cannot speak too highly of the machine and would hate to sail a boat without one. I found 5 fathoms of water off Vermilion Point, Lake Superior, last season where the chart indicates 17 fathoms. It has been quite a number of years since the lakes have been surveyed and it is surprising how many shoal spots one finds and the reason we find them is because the sounding machine is always ready and it isn't any trouble to use it. They are certainly a great addition to the lake steamer."

Capt. B. M. Landgrass, of the steamer LaBelle, also says that he would not like to be without one and thinks that all steamers should be equipped with the machine.

In fact there is no need of testimonials in favor of this machine. The time-saving element appeals to most masters as it is possible to take accurate soundings without checking. With the hand lead it is necessary to check down to three or four miles an hour.

The machine, of which an illustration is herewith given, consists of a stand, together with a reel containing 250 fathoms of fine piano wire, to which is attached a 25-pound lead having a hollow space large enough to take the nickel plated depth gage.

The working of the instrument is based on the pressure of the water, the depth gage having a very small hole, through which the water is forced against the air pressure as the lead is lowered. On being brought to the surface the depth gage is opened and the water in it measured by a small ebony gage.

These ebony measuring gages are so designed that the fathoms measure equidistant. In every other atmospheric gage half the length is required to record the first 5 fathoms.

As the working of the instrument depends entirely upon the pressure of the water, soundings up to 100 fathoms can easily be taken while the vessel is going full speed.

The machine is small in size, taking up little space on deck and the lead and wire is of such size as to offer little resistance to the water.

It has no spring arrangements and the gage is of such strength that it will stand rough handling without injury.

It works equally well in all weather and no special instruction or extra crew is necessary to operate. If the captain wishes he can control the machine and be sure of the exact number of fathoms by personally closing and opening the cap of the gage. The approximate depth can always be determined by the length

of wire out, as shown by the dial on the machine. It can be operated from the bridge.

BRONZE CLOCK FOR CAPT. MATTHEW ANDERSON.

When the Anchor Line steamer Clarion was on fire near South East Shoal, Lake Erie, Dec. 8, 1909, Captain M. Anderson, of the steamer L. C. Hanna, at the risk of his ship and risk of himself and his crew, managed to get alongside of the Clarion and safely rescued six men, then remaining on the burning steamer, as fully described in MARINE REVIEW for January.

In recognition of the bravery of Capt. Anderson and the service rendered in rescuing these six men, the board of directors of the Erie & Western Transportation Co. (Anchor Line) adopted the following preambles and resolution:

Whereas, This company's steamer



BRONZE SHIPS' CLOCK PRESENTED TO CAPT. MATTHEW ANDERSON.

Clarion was destroyed by fire off South-east Shoal Light Ship, Lake Erie, Dec. 8, 1909, and fifteen of her crew perished. And

Whereas, While the said Clarion was burning, and a heavy sea running, Capt. M. Anderson, then commanding the steamer L. C. Hanna, bravely ran his steamer alongside the burning vessel and after repeated efforts succeeded in saving the lives of six remaining members of the crew.

RESOLVED, That the thanks of the Erie & Western Transportation Co. are hereby given to Capt. Anderson for his brave and humane action, and that the president is requested to transmit to Capt. Anderson an engrossed copy of the preambles and resolution, duly attested, accompanied by some suitable testimonial.

And in accordance with this resolution, the Erie & Western Transportation Co. has sent to Capt. Anderson a solid bronze ships' clock, as shown in the illustration herewith, and has also sent

him an engrossed copy of the preambles and resolution referred to. The inscription on the base of the clock is as follows:

Presented by the Erie & Western Transportation Co. to Capt. M. Anderson, of the steamer L. C. Hanna, in grateful recognition of his bravery in rescuing six of the crew from the steamer Clarion while burning on Lake Erie, Dec. 8, 1909.

FREIGHT SITUATION FOR 1910.

Vessel owners, dock operators and shippers reached an agreement early in January regarding the ore trade for 1910. As ore prices both of Bessemer and non-Bessemer had been marked up 50 cents it was practically certain that freight rates would be restored to the basis of 1907, that is to say, 75 cents from the head of the lakes, 70 cents from Marquette, and 60 cents from Escanaba. While this rate will not be paid it will work out however to the same sum. Carrying charges have been fixed upon the basis of 70 cents from the head of the lakes, 65 cents from Marquette and 55 cents from Escanaba, but the unloading charge, which is paid by the vessel, has been reduced from 20 cents to 15 cents a ton. The reduction in the unloading charge is quite significant, it being the first concession that the dock operators have made to the vessel owners since the development of the self-filling bucket. During the past 10 years and especially during the past three or four, the efficiency of the unloading plants at Lake Erie ports has been wonderfully developed, so much so that it is common practice to unload a 10,000-ton steamer in a working day of 10 hours and occasionally two or three hours are clipped off this record. Vessel owners have felt all along that the unloading charge was too high and that they should have a share in the palpable reduction of costs, especially so as the structure of the ship itself had been radically altered to meet the requirements of the unloading machines. Unloading costs are difficult to obtain but it has been declared by experts that, including maintenance and depreciation, ore can be unloaded at a cost of from five to six cents per ton.

There has been opposition in certain quarters to this reduction in the unloading charge but as the leading docks have consented to it it will in all probability be put into effect.

There is a general feeling in the trade that the owner is entitled to a freight rate of 75 cents or its equivalent. During the past two years the

rate has been 10 cents a ton less but there is little or no money in the business at that figure. Some of the modern steamers have done no more than take care of their bonds and distribute about 4 per cent among their stock holders.

It is expected that about 50,000,000 tons will be moved during 1910, which at an advance of 10 cents gives an added earning capacity of \$5,000,000 to the fleet. The Pittsburg Steamship Co. expects to move about 27,000,000 tons. It has chartered about 15,000,000 and has capacity to move in its own vessels about 12,000,000 tons.

The coal rate is as yet unsettled. It was cut 5 cents last year to Lake Michigan ports but it is expected to be restored this year, making the rate 40 cents to Milwaukee and 35 cents to the smaller ports. As there is a great demand for coal in the northwest every vessel that wants a cargo for the first trip can get it. Shippers are paying 10 cents for storage in addition to the opening rate.

LAKE COAL SHIPMENTS.

It is expected that coal shipments during 1910 will be the heaviest on record. Practically every vessel that wants a cargo of coal for the opening trip can get it. Vessels are receiving 10 cents a ton for winter storage at all ports except Buffalo, where 15 cents is received, and the fleet will move as soon as weather conditions permit.

Figures received from the railways indicate that lake coal shipments for all districts during the past nine years were as follows:

Year.	Pittsburg District.	Ohio District.	W. Va. District.	Total.
1901.....	3,795,706	1,954,825	787,572	6,538,103
1902.....	4,704,093	2,689,974	965,769	8,359,836
1903.....	6,092,047	2,458,265	1,539,435	10,089,747
1904.....	6,058,383	2,138,274	1,279,876	9,476,506
1905.....	7,443,883	2,062,692	2,109,262	11,615,837
1906.....	9,287,272	2,560,906	2,743,732	14,591,910
1907.....	10,549,995	4,074,296	3,420,941	18,037,232
1908.....	8,700,000	3,600,000	3,450,000	15,750,000
1909.....	8,687,305	3,002,815	3,874,570	15,564,690

NAVY COAL TO THE PACIFIC COAST.

(From the *Stars and Stripes*, Seattle.)

The friends of the navy in Washington are at it again in their attempt to justify the shipment of hundreds of thousands of tons of Pocahontas coal to the Pacific coast for consumption in the Pacific cruiser fleet. The *Army and Navy Journal*, on Dec. 11, in criticism of the naval waste articles appearing in the *Cleveland MARINE REVIEW* under the caption of "The Navy and Our Merchant Marine", recites that "the statements made by the officials of the navy department before

congress prove conclusively the attitude of fairness, which the navy has steadfastly maintained toward the merchant marine of this country."

If it were a fact that it was necessary to ship those hundreds of thousands of tons to the Pacific coast, there would then be justification for the action of Rear Admiral Cowles, the naval board and the secretary of the navy. But it was not necessary to ship all of that Pocahontas coal to this coast, therefore it was unnecessary to employ so many foreign colliers. Shipping on Puget sound has been demoralized because of the action of those navy officials, and a great financial waste has obtained because of those unnecessary expenditures. We know the necessity to consume Pocahontas coal in American naval vessels does not exist, except when it is desired to make special tests. We know that merchant marine vessels with water tube boilers are constantly making speed records, with the use of Pacific coast coal; therefore, we know it is possible for the navy to consume it with successful results upon its cruising ships if it so desires, and statements to the opposite will not change the facts, regardless of whence they come. We do not know the truth of all the statements of the writer of the naval articles, because we have no knowledge regarding many of them, but we do know the views of that writer with regard to the transportation of coal expresses the facts, and therefore are constrained to believe the naval waste articles are based upon facts, because the tremendous unnecessary naval

waste did obtain in the shipment of coal to the Pacific coast.

LAKE GRAIN SHIPMENTS.

Following have been shipments of grain by lakes for the past five years:

Year.	Bushels.
1909.....	284,670,486
1908.....	255,487,572
1907.....	297,150,861
1906.....	289,929,614
1905.....	259,168,109

The index for THE MARINE REVIEW for 1909 (Volume 39) is now ready and will be mailed to subscribers upon application.

EXEMPT FROM TONNAGE TAXES.

Eugene Tyler Chamberlain, commissioner of navigation, has sent to collectors and customs a copy of a letter to Goulder, Holding & Masten, of Cleveland, in which the Bureau holds that vessels from foreign ports entering or touching solely for the purpose of taking on bunker coal are not engaged in trade and are therefore exempt from tonnage duties. The letter follows:

"The Bureau has received your petition of even date on behalf of the Pittsburg Coal Co., Port Royal Dock Co., Pickands, Mather & Co., and Stanley B. Smith Co., in which it is represented that they and others maintain steamer fueling plants at Sault Ste. Marie, Detour and Detroit for the purpose of fueling steamers engaged in commerce and navigation on the Great Lakes; that since Oct. 5, 1909, when Section 36 of the act of Aug. 5, 1909, 'to provide revenue, equalize duties, and encourage the industries of the United States and for other purposes' went into effect, collectors of customs have been exacting of vessels from foreign ports stopping solely for the purpose of taking on bunker fuel (in quantities averaging about 75 tons per steamer), a tonnage tax of 2 cents per ton, as provided by section 36 of the act.

"You protest against the collection of this tonnage tax on the ground that 'vessels in distress or not engaged in trade' are exempt from the imposition of the tax. The effect of the tax, you contend, is to deprive the petitioners of their market for fuel or bunker coal without any increase of revenue to the government, betterment of our industries, or the accomplishment of any purpose within the intent of the act, and the effect of the tax in these cases is to destroy the market, a result which you contend should not be permitted unless necessitated by express, mandatory language of the act.

"The bureau concurs in your view that the attempted imposition of the tax in such cases does not 'provide revenue, equalize duties or encourage the industries of the United States,' and that the exemption of the vessels under consideration would not run counter to the declared purposes of the tariff act of Aug. 5, 1909. The 'trade' contemplated by that act is that intercourse which brings goods into the United States in competition with American industries or comes into the ports of the United States seeking the carriage of goods. Since Oct. 5, 1909, the words 'vessels in distress or not engaged in trade' must be read in the light of the purpose of the act of which they are now a part. In this sense vessels from foreign ports entering or touching solely for the pur-

pose of taking on bunker coal sufficient only to enable them to complete the voyage are, in the opinion of the bureau, 'vessels not engaged in trade' within the intent of section 36 of the act of Aug. 5, 1909, and are, accordingly, exempt from the tonnage duties prescribed by that section.

Instruction to this effect will be sent to collectors of customs.

Respectfully,

E. T. CHAMBERLAIN,
Commissioner.

OBITUARY.

Abram Smith, the pioneer ship builder, died at his home at Algonac, Mich., on Jan. 20, in his ninety-first year. Mr. Smith was born in the town in which he lived and died. When he was born, there were neither telegraphs nor telephones nor railways nor even envelopes. The battle of Waterloo had only been fought four years and Bonaparte was still at St. Helena. There were no



ABRAM SMITH.

vessels of any kind on the lakes except the tiniest of schooners and none whatever on Lake Superior except birch bark canoes. As a boy, Smith carried the mail on horseback. It was not until he was 30 years of age that he began building vessels and during his long life he built a number of creditable schooners. He leaves two daughters and three sons, Mrs. G. E. C. Seaman, of Sault Ste. Marie, Mich.; Mrs. W. K. Moore, of Algonac; J. B. Smith, L'Anse; J. A. Smith, of Detroit, and A. M. Smith, of Algonac.

The American Ship Building Co. at its West Superior yard is lengthening the steamer James H. Hoyt by 48 ft.

IN BEHALF OF OUR MERCHANT MARINE.

Congressman James Francis Burke addressed the Tippecanoe Club, of Cleveland, on Jan. 28, on the revival of the merchant marine of the United States. He presented many important facts, saying among other things:

The most remarkable feature of the opposition to the proposed legislation on behalf of the American merchant marine is the seeming inability or indisposition on the part of many to give the subject any earnest thought. It seems to be assumed that the reasons the foreigners handle all our foreign commerce is because they can do it cheaper and that our shippers and the country at large are therefore gainers thereby. Believing that, we deceive only ourselves, for the \$200,000,000 we pay annually to foreign nations for carrying our commerce is gone forever—like yesterday—like the water that runs over the wheel. What other country than our own, stupendous in its resources, could stand such a constant drain? We are merely, out of our thoughtless bounty, supporting the nations of the old world; furnishing the very sinews of a war of which we are the objective and common enemy—a war for the trade of the world.

But let us consider a few figures—not uninteresting either. It is proposed to extend and amplify the Ocean Mail Act of 1891, but with the stipulation that the sums paid under it shall in no year exceed the profits on sea postage, which are over \$6,000,000 per year. Let us suppose that we spent \$4,000,000 of that fund for additional mail service. The rate proposed is \$4 per mile for the *outward voyage only*. Then for the minimum voyage, 4,000 miles, a ship would earn \$16,000, or per year, at six voyages, say \$100,000. Our \$4,000,000 then would require the construction and operation of at least 40 big ships at once for such service alone. The cost of those ships would not be less than \$1,000,000 each, or \$40,000,000. Of this enormous sum over 80 per cent represents actual wages paid to labor, from the ore in the mine, the seed in the ground, the tree in the forest, to the finished fleet afloat but not yet under way. And once in service, the pay roll alone of these 40 ships, as taken from the records of actual ships, would be not less than \$100,000 per year each, or in each year a sum equal to the total amount of mail pay, and every dollar of the foregoing stays with us instead of going to the foreigner. And besides all this, the coal to be mined, the food to be provided, the repairs for our workmen, and beyond all, the opening

up of new markets through direct and swift channels of communication which do not now exist. And herein is no appeal to sentiment; no waving of the flag; no harsh criticisms or reflections on foreign interests; nothing but *cold, hard facts*.

It is not claimed that these mail steamers are going to carry our bulk cargoes; that they are going to drive the foreign ships out of our ports, but that they will mark and assist the beginning of new methods, the opening of new markets, the transportation of the lighter and immensely more valuable manufactured products which the tramp does not handle, and the latter will come of itself. But if the Ocean Mail Act did none of these things, I claim that the production of those 40 ships in itself is worth the cost to our country over and over again. The United States spent in 1898 and 1899 over \$9,000,000 for a fleet of 16 second-hand steamers for army transports, some of them over 25 years old when we bought them, and every last one of them built abroad, because there did not exist then, and does not today, a fleet of American ships on which an army can be moved. Those ships are inactive now and the money spent for them then and for their maintenance since is that much drawn from the channels of productive business, which if spent in building ships which could be utilized when needed and left to mercantile pursuits in times of peace would be continually adding to our national wealth.

Cleveland is the home of the Merchant Marine League, here it was born, and its efforts have been felt in every state in the Union. They have been ably seconded by representative commercial, professional, social and labor organizations the country over. It has been frequently charged that Cleveland is active in this matter because it is prominent as a center of steel production and ship building, and that it is the steel makers and the ship builders who are behind this movement for the restoration of the merchant marine.

Well, it is to be hoped they are with it. Their help is desired and their knowledge of the real conditions cannot but be helpful, but as a matter of fact the steelmakers, as such, are not even languidly interested. I am informed by a ship builder that the average weight of steel in these 40 ships would probably be about 5,000 tons as a maximum, or 200,000 tons in all. There were made in 1907, our banner year, in the United States, a little under 22,500,000 tons of steel, so that all the steel involved in the construction of these 40 ships even if they could be built in one year, an

impossible thing, would be less than 8/10 of 1 per cent of the steel output of the country. Gentlemen of Cleveland, I am ashamed of you! To think that you are so infinitesimal. When that little 8/10 of 1 per cent is divided up among the steel makers the profits on each share must be staggering indeed.

Just how Cleveland ship builders are to be gainers I would like to learn. Perhaps they have evolved some method by which such ships can be got from the great lakes to the sea. But if Cleveland steel makers and Cleveland ship builders are behind this movement, let us all be glad, for they have nothing to gain except in common with all other citizens, and their support is worth much.

CORRECTION.

In the list of accidents published in the January issue of THE MARINE REVIEW it was inadvertently stated that the package freighter Clarion of the Anchor line which burned off Southeast Shoal was a wooden steamer. The Clarion was an iron steamer.

The license of Capt. William H. Plumb, master of the steamer Rutland, was suspended for four months by Local Inspectors Pope and Nolan, of Buffalo, who held him responsible for the damage to his boat while going into Buffalo harbor on Nov. 16 last. The Rutland struck on Waverley shoal and was badly damaged. An appeal to Capt. James Stone, supervising inspector, was taken but he has declined to interfere with the ruling of the local inspectors.

The Pittsburg Steamship Co. has given an order to the American Ship Building Co. for rebuilding a number of its vessels. The steamers Van Hise and Bunsen will be rebuilt and changed to arch construction. The Rockefeller will also be changed to arch construction and her hatches widened. The hatches of the steamer Ericsson and the barge Holley will also be widened.

The steamer John B. Cowle, building for the United States Transportation Co., will be launched from the Lorain yard of the American Ship Building Co. on Feb. 26.

The two package freighters building for the Rutland Transit Co. at the Wyandotte yard of the American Ship Building Co. will be named Arlington and Brandon.

WINTER MOORING LIST OF LAKE VESSELS.

ALGONAC, MICH.

Sch. Arenac	Sch. McWilliams, Ed.
Str. Hayward, A. D.	Str. Stafford, W. R.
Str. Langell, Simon	Str. Starke, C. H.

ALPENA, MICH.

Str. Carter, W. J.	Str. Hall, S. C.
Tug Cooper.	Str. Saginaw.
Bge. Flint, Sam.	

AMHERSTBURG, ONT.

Tug Pallister.

ASHLAND, WIS.

Tug Ashland.

ASHTABULA, O.

Bge. Constitution.	Str. Presque Isle.
Str. Crete.	Str. Sierra.
Str. Morrow, Joe S.	Sch. Thompson, A. W.
Str. Normania.	

BAY CITY, MICH.

Tug Breymann, G. H.	Str. Donaldson, J. P.
Bge. Buckhout, B. B.	Str. Holland, Robert.
Bge. Dayton.	Bge. Wright, A. W.

BENTON HARBOR, MICH.

Sch. Reuse, Simmons.	Str. City of Traverse.
Str. City of Benton	Str. Holland.
	[Harbor. Str. Puritan.
Str. City of Chicago.	

BLACK ROCK, N. Y.

Bge. Aloha.	Str. Mohegan.
Bge. Mingoe.	Bge. Wilson, Annabell.

BROCKVILLE, ONT.

Str. Bermuda.	Str. Marshall, Samuel.
---------------	------------------------

BUFFALO, N. Y.

Str. Admiral.	Bge. Miztec.
Str. Alaska.	Str. Mohawk.
Str. Alva.	Str. Moll, Clifford F.
Str. Americana.	Str. Neptune.
Str. Andrews, Matthew.	Str. Northern King.
Str. Arizona.	Str. Northern Queen.
Str. Aztec.	Str. North Land.
Str. Bartow, J. H.	Str. North Sea.
Str. Binghamton.	Str. North West.
Str. Bixby, W. K.	Str. Nottingham, Wm.
Str. Bope, H. P.	Dge. No. 1.
Bge. Bourke, Mary N.	Drill Boat No. 3.
Sch. Boyce, Geo. J.	Str. Osborne, F. M.
Str. Brower, A. G.	Str. Owego.
Str. Brown, J. J. H.	Str. Owen, John.
Str. Brown, W. L.	Str. Panay.
Str. Buffalo.	Str. Penobscot.
Str. Chemung.	Str. Pope, C. C.
Str. Chicago.	Str. Rhodes, Wm.
Str. Colorus.	[Castle.
Str. Colonel.	Str. Rochester.
Str. Commodore.	Str. Russel, Geo. H.
Sch. Commodore.	Str. St. Paul.
Str. Corrigan, J.	Str. Saranac.
Str. Craig, George L.	Str. Schoolcraft.
Str. Cranage, Thomas.	Bge. Scotia.
Str. Davock, Wm. B.	Str. Scranton, Walter.
Str. De Graff, L. S.	Str. Senator.
Str. Donnacona.	Str. Shaughnessy, Sir
Str. Durston, J. F.	[Thomas.
Str. Fasset, T. S.	Str. Smith, B. Lyman.
Str. Gilchrist.	Str. Smith, Lyman C.
Str. Gratwick, W. H.	Str. Smith, Monroe C.
Sch. Hackley, C. H.	Str. Smith, Wilbert L.
Str. Hanna, Howard	Str. Sonora.
[M., Jr.	Str. Stadacona.
Str. Hart, F. W.	Str. Steel King.
Str. Hebard Chas. S.	Str. Sultana.
Bge. Holland, N. C.	Str. Superior.
Str. Huron.	Str. Svracuse.
Str. Iron King.	Str. Thompson, Smith.
Bge. Iron Queen.	Str. Tioga.
Str. Lehigh.	Str. Tionesta.
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Tug McNaughton, P. B.	Str. Uranus.
Str. Mack, Wm. S.	Str. Utica.
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Str. Milwaukee.	Str. Watson, C. W.
Str. Minch, Anna C.	Str. Weeks, J. L.
Str. Minch, Philip.	Str. Winnipeg.
Sch. Minerva.	Str. Yale.

BYNG INLET, ONT.

Bge. Francomb.

CHATHAM, ONT.

Sch. Hutt, Hattie.

CHICAGO, ILL.

Str. Baker, George F.	Str. Linden.
Str. Bennington.	Str. Linn.
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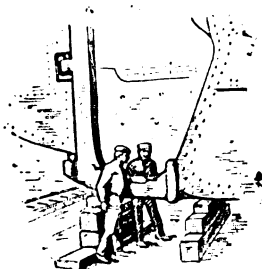
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 Str. Ireland, R. L. Str. Sullivan, J. J.
 Str. Jenkins, Chas. O. Str. Sylvania.
 Str. Lake Shore. Str. Wallace, Jas. C.
 Str. Livingstone. Str. Wolvin, Aug. B.
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 Str. McWilliams, J. J. Str. Woodruff, Lewis.

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 Str. Ishpeming. Drill Boat No. 3.
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 Gas. Logan, William. Str. Shadle, J. H.
 Str. Mather, W. G. Str. Snyder, Wm. P.
 Str. Michigan. Str. White, Peter.
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 Drill Boat No. 1. Str. Wilpen.

ERIE, PA.

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 Str. Caspian. Str. Ramona.
 Str. Donnelly. Str. Rideau King.
 Sch. Ferry, Maj. N. H. Str. Rideau Queen.
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 Str. Nevada.

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 Pge. Holley. Str. Sellwood, Joseph.
 Str. Hefflinger, F. T. Bge. Thomas.
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 Str. Peters. Str. Helen C.
 Str. Bge. Schroeder, J. Str. Marshall, I. D.
 Str. Bge. Wentz, R. G. Str. Marshall, Maggie.
 Str. Wotan. Str. Nessen, N. J.
 Str. Normandie.

MANITOWOC, WIS.

Str. Brown, Fayette. Str. Mills, Robert.
 Str. Burnham, George. Str. Morse, S. F. B.
 Str. Carolina. Str. Murphy, Simon J.
 Str. Chicago. Str. Orion.
 Str. Chippewa. Str. Princeton.
 Str. Christopher. Str. Rees, W. D.
 [Columbus. Str. Sheboygan.
 Str. Cornell. Str. United States.
 Str. Gates, J. W. Str. Victory.
 Str. German. Str. Virginia.
 Str. Grammer, G. J. Str. Watt, James.
 Str. La Salle. Str. Wolf, W. H.
 Str. Marina. [wood).
 Str. Matoa. Str. Wright, A. P.

MARINE CITY, MICH.

Str. Canisteo. Str. New York.
 Bge. Chinook. Str. Bge. Otis, John.
 Str. Bge. Desmond. Bge. Rawson, L.
 Str. Gogebic. Str. Sicken, M.
 Bge. Knapp, F. M. Tug Smith, Annie L.
 Str. McLaugh, S. C. Teutonia.
 Str. Maine. Bge. Uranus.
 Bge. Melvina. Bge. Whitney, G.

MARQUETTE, MICH.

Str. Pathfinder. Str. Warner, R. S.

MICHIGAN CITY, IND.

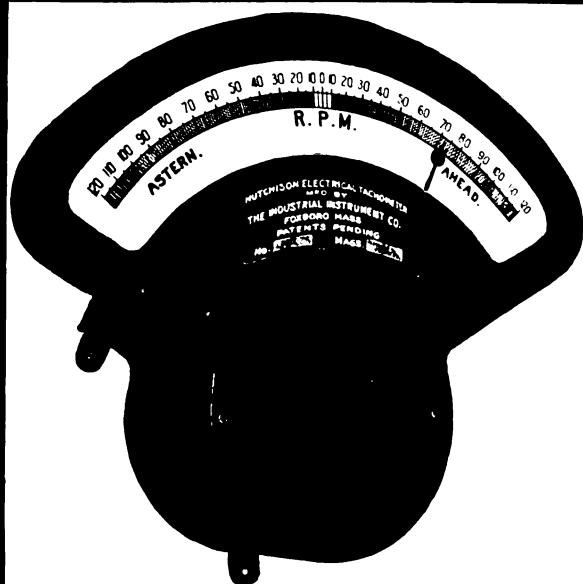
Str. Roosevelt, Theo. Str. Parks, O. E.

MIDLAND, ONT.

Str. Collingwood. Str. Midland Prince.
 Str. Empress of [Midland. Str. Mt. Stephen.
 Str. Magnolia. Str. Reliance.
 Str. Midland King. Str. Traveler.
 Str. Westmount.

MILWAUKEE, WIS.

Str. Barlum, John J. Str. Neff, Chas. S.
 Str. Brown, Harvey H. Str. Neosho.
 Str. Buffington, E. J. Str. Nye, Harold B.
 Str. Carnegie, Andrew. Str. Oades, John.



Engine Room Type Indicator

Hutchison Marine Tachometer

Saves Coal—Prevents Accident

Accurately indicates at any number of places aboard ship, the

Direction and Rate of Rotation of the Screws

No Commutators, Brushes or Contacts to clean or renew

No Batteries to charge or replace

No Pipes to leak or become stopped up

No Pumps to Pack or repair

No Shafts to break

**No Attention
Required**

**Steady Pointer
Simple, Durable**

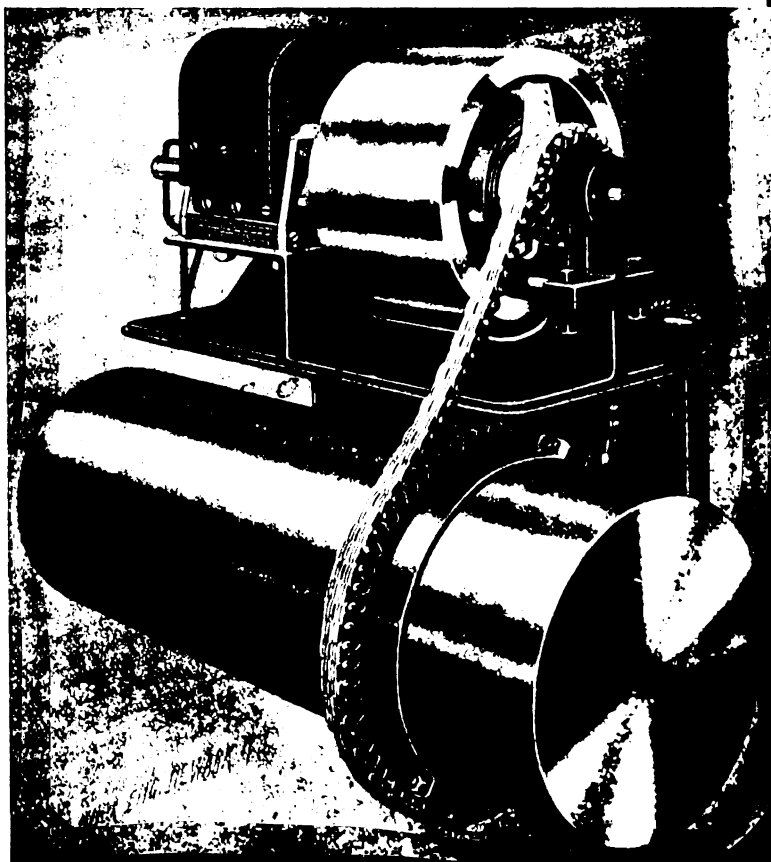
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SAN FRANCISCO**



Str. City of Genoa.
Str. City of Naples.
Str. City of Rome.
Sch. City of Sheboygan.
Str. Colonial.
Str. Corona.
Str. Cumberland.
Str. Dalton, H. G.
Str. Davidson, A. D.
Str. Dunham, Jas. S.
Str. Eddy, C. A.
Str. Edenborn.
Str. Flower, R. P.
Str. French, G. Watson.
Str. Gilchrist, F. W.
Str. Gilchrist, J. C.
Str. Hand, C. C.
Str. Hecker, F. J.
Str. Helena.
Str. Hennepin.
Str. Holden, H. S.
Str. Kerr, W. B.
Str. Lansing.
Str. Livingstone, Wm.
Str. McDougall, Alex.
Str. McKinney, Price.
Str. Manchester.
Str. Marion.
Str. Mariposa.
Str. Maritana.
Str. Mars.
Str. Maryland.
Str. Maytham, Thos.
Str. Merrimac.
Str. Mills, W. M.
Str. Mitchell, John.
Str. Oglebay, E. W.
Str. Oliver, Henry W.
Str. Onoko.
Str. Poe, Gen. O. M.
Str. Pueblo.
Str. Queen City.
Str. Kesselaer.
Str. Rhodes, R. R.
Str. Rogers, H. H.
Str. Schlesinger, F.
Str. Shaw, Howard L.
Str. Sherwin, John.
Str. Siemens, Sir Wm.
Str. Sill, H. S.
Str. Soper, Albert.
Sch. Stafford.
Str. Stephenson, Geo.
Str. Stewart, A. E.
Str. Taylor, Moses.
Str. Topeka.
Str. Tower, C.
Str. Upson, A. S.
Str. Upson, J. E.
Str. Vance, F. L.
Str. Venus.
Str. Vermillion.
Str. Verona.
Str. Vulcan.
Str. Volunteer.
Str. Waldo, L. C.
Str. Wallula.
Str. Warner, Chas. M.
Str. Wawatam.
Str. Weston, Chas.
Str. Whitaker, Byron.
Str. White, Pennsylvania.
Str. Wilson, Ca.
Str. Munro, J.

MONTREAL, QUE.

Str. Boucherville.
Str. Hebron.
Str. Longueuil.
Str. Princess.
Str. Tagona.

MUD LAKE.

Str. Steinbrenner, Henry.

MUSKEGON, MICH.

Str. Markham, Geo. C. Str. Stephenson, S. M.

NORTH TONAWANDA, N. Y.

Str. Clyde.
Str. Columbia.
Str. Curtis, C. F.
Str. Fleetwood.
Sch. Genoa.
Str. Green, C. H.
Str. Martin, S. K.
Sch. Moore, W. K.
Bge. Moravia.
Str. Oceanica.
Bge. 118.
Bge. 131.
Bge. 133.
Sch. Our Son.
Str. Packer.
Bge. Pendell, D.
Bge. Pennington.
Str. Veronica.

OGDENSBURG, N. Y.

Bge. Argosy.
Str. Averell.
Str. Avon.
Bge. Buckley, Jas.
Str. Burlington.
Str. Carleton.
Bge. Carney, Fred.
Str. Hall, H. B.
Str. Haskell.
Bge. H. B.
Str. Hecla.
Bge. Hoboken.
Bge. Ireland.
Str. Langdon.
Bge. Lyon.
Bge. Matthews.
Tug Meade, Spencer.
Bge. Menominee.
Str. Mercur, Fred.
Bge. Middlesex.
Tug Myra.
Str. Nicaragua.
Str. Nipigon.
Str. Ogdensburg.
Tug Pandora.
Tug Proctor, W. L.
Tug Rescue.
Str. Rugee.
Str. Sage, Russell.
Tug Seymour, Geo. D.
Bge. Sherman.
Bge. Stephenson, I.
Bge. Twin Sisters.
Bge. Witbeck, Henry.

OSWEGO, N. Y.

Bge. Aberdeen.
Bge. Diamond.
Str. Florence.
Bge. Georger, F. A.
Str. Lambert, John.
Str. Omaha.
Str. Parent, S. N.

OTTAWA, ONT.

Str. Empress.
Str. Hall.
Str. Ottawan.
Str. Roberval.
Str. Scotsman.
Str. Victoria.

OWEN SOUND, ONT.

Str. Alberta.
Str. Algonquin.
Str. Assiniboia.
Str. Caribou.
Str. City of Midland.
Str. Glenmount.
Str. Keewatin.
Str. Manitoba.
Str. Manitou.
Str. Turret Court.

PENETANGUISHENE, ONT.

Str. Chamberlain.
Str. Wahnapiatae.
[C. W.]

PICTON, ONT.

Str. Aberdeen.
Str. Alexandria.
Str. Porter, Lloyd S.
Bge. Reid, Isabel.
Bge. Rob Roy.
Str. Water Lily.

POINT ANNIE, ONT.

Bge. Antelope.
Bge. Sligo.

POINT EDWARD, ONT.

Str. Pellatt, H. M.
Str. Scottish Hero.
Sch. Sephie.
Sch. Tolmie.

PORT ARTHUR, ONT.

Str. Beaverton.
Str. Kamistiquia.
Str. Kenora.
Str. Nicaragua.
Str. Van Allan, D. R.
Str. Wells, Frederick.
Str. Zimmerman, [Eugene]

PORT CLINTON, O.

Str. Miamia

PORT COLBORNE, ONT.

Str. Strathecona

PORT DALHOUSIE, ONT.

Str. Cataract

PORT HOPE, ONT.

Sch. Mowat, Oliver

PORT HURON, MICH.

Bge. Brake, William.
Str. Britannic.
Bge. Edwards, J. R.
Str. Fitzgerald, W. E.
Str. Kotcher, C. W.
Bge. Orton, M. E.
Str. Pawnee.
Str. Western Star.

PORT STANLEY, ONT.

Str. Acadian

PORT WING, WIS.

Str. Hilton

QUEBEC, QUE.

Bge. A. D.
Bge. Ewen, F. D.
Str. Hackett, J. H.
Str. Hackett, William.
Str. Murray Bay.
Str. Tadousac.

SAGINAW, MICH.

Bge. Cahoon, T. H.
Str. Flora.
Bge. Jackson, G. K.
Str. Langell Boys.
Str. Warren, Homer.
Bge. White & Friant.

ST. CLAIR, MICH.

Str. Douglas of
Sch. Iron Cliff.
Str. Maud.
Str. North Star.

ST. IGNACE, MICH.

Str. Algoma.
Str. Duluth.
Str. Wau-Kon.

ST. JAMES, MICH.

Tug Ryan

SANDUSKY, O.

Str. Annie Laura.
Str. Arrow.
Str. Boeckling, G. A.
Str. Clinton.
Str. Columbus.
Str. Gowen, A. Y.
Str. Hays, R. B.
Str. Hazel.
Str. Lakeside.
Str. Mary H.
Bge. Moran, David.
Str. Reor, E. P.
Str. Wehrle, A. Jr.

SANDWICH, ONT.

Str. Harper, John

SARNIA, ONT.

Bge. Donaldson.
Str. Dunelm.
Str. Marmonie.
Str. Huronic.
Str. Ionic.
Str. Neepawah.
Bge. Neil, Fannie.
Str. Rosedale.
Str. Saronic.
Str. Winona.

SAULT STE. MARIE, MICH.

Tug Bues, F. H.
Str. Columbia.
Bge. Edwards Bros., [No. 1]
Dge. Edwards Bros., [No. 2]
Tug James Edward
Dge. Majestic

SAULT STE. MARIE, ONT.

Str. Agawa.
Tug Amsworth, C. E.
Bge. Barlum, John J.
Tug Capt. Jim.
Tug Commodore.
Str. Gargantua.
Tug Hall, Jessie.
Tug Kate.
Str. Meaford.
Tug Noble, John.
Tug Emerson, George.

SAWYER, WIS.

Bge. Butman, M.
Bge. Carpenter, A. A.
Tug Torrent

SHEBOYGAN, WIS.

Str. America.
Str. Brazil

SOREL, QUE.

Str. Beaupre.
Str. Berthier.
Str. Chambly.
Str. Chicoutimi.
Str. Cornwall.
Str. Hamilton.
Str. Montreal.
Str. Quebec.
Str. Rapids King.
Str. Rapids Queen.
Str. St. Irene.
Str. Terrebonne.
Str. Three Rivers.

SOUTH HAVEN, MICH.

Str. City of Kala.
Str. City of South.
[Imazoo]
[Haven]

SOUTH CHICAGO, ILL.

Str. Barlum, Thomas.
Str. Butler, Jos. G. Jr.
Str. City of Bangor.
Str. Clement, Stephan.
Str. Crerar, John.
Str. Elphick, Mary C.
Str. Fischer, S. M.
Str. Goodyear.
Str. Hanna, D. R.
Str. Hemlock.
Str. Howe, George C.
Str. Hutchison, J. T.
Bge. No. 1.
Str. Peck, E. M.
Str. Sharples, John.
Str. Stanton, John.
Str. Wallace, Robert.
Str. Williams, George.

SPRING LAKE, MICH.

Str. Walsh, Lizzie

STURGEON BAY, WIS.

Bge. Advance.
Str. Bon Ami.
Str. Buckley, Edward.
Bge. Corning, Ida.
Bge. Doherty, Mike.
Str. Foster.
Str. Hart, Fannie C.
Bge. Hurd.
Bge. Kellogg.
Tug Lorena.
Str. Lotus.
Str. Maywood.
Sch. Mott, Richard.
Str. Neff, S. O.
Bge. Oak Leaf.
Str. Ogontz.
Str. Pahlow, Louis.
Bge. Pewaukee.
Str. Sailor Boy.
Bge. Senator.
Tug Smith.
Str. Thistle.

SUPERIOR, WIS.

Str. LaBelle.
Str. Minneapolis.
Str. Northern Light.
Str. Northern Wave.
Str. North Lake.
Str. North Wind.

THOROLD, ONT.

Str. Fairmount.
Str. Haddington.
Str. Iroquois.
Str. Mapleton.

TIFFIN, ONT.

Str. Matthews, W. D.

TOLEDO, O.

Str. Angeline.
Str. Ball, F. C.
Sch. Barnes, C. C.
Str. Bessemer.
Tug Blazier, J. S.
Tug Breyman, John B.
Str. Calumet.
Str. Cherokee.
Sch. Chickamauga.
Sch. Chippewa.
Str. Commerce.
Sch. Crete.
Tug Dexter.
Str. DoVille, R. E.
Str. Dussault, D.
Str. Eads.
Str. Ella G.
Str. Ellwood.
Str. Harvard.
Str. Laura D.
Bge. Lozen, J. B.
Str. Maruba.
Str. Moore, J. W.
Str. Mulnix Bros.
Str. Odanah.
Bge. 137.
Str. Rogers, Wm. A.
Str. Roumania.
Bge. Sagamore.
Tug Shelby, Edward.
Str. Smith, Hulbert W.
Str. Smith, L. C.
Bge. Tyrone.
Str. Walter D.
Str. Yuma.

TONAWANDA, N. Y.

Sch. Hutchison.
Str. Italia.
Bge. Looming.
Bge. McGregor, Wm.
Bge. Sweetheart.

TORONTO, ONT.

Str. Ada Alice.
Str. Arlington.
Sch. Arthur.
Str. Bluebell.
Str. Cayuga.
Str. Chicora.
Str. Chippewa.
Str. City of Montreal.
Str. City of Ottawa.
Str. Clark Bros.
Str. Congercoal.
Str. Corona.
Str. Corunna.
Sch. Dunn, S. H.
Str. Glenellah.
Str. Hanlan, John.
Str. Island Queen.
Str. Jasmine.
Str. Juno.
Str. Kathleen.
Str. Kingston.
Bge. Locke, P. B.
Str. Lucella.
Str. Mayflower.
Str. Ongiara.
Str. Primrose.
Bge. Recruit.
Str. Rolph, John.
Str. Toronto.
Str. Turbinia.

TRENTON, ONT.

Bge. Warmington.
Str. Holcomb.
[George H.] [Ralph T.]
Str. Iona.

WADDINGTON, N. Y.

Bge. Katie H.
Bge. Klondyke.
Bge. Zapotec.

WALKERVILLE, ONT.

Str. Canadian

WAUKEGAN, ILL.

Str. Wickwire Theodore II.

WESTERVILLE, ONT.

Dge. Edwards Bros. No. 3

WINDSOR, ONT.

Str. Britannic.
Str. Columbia.
Str. Sappho.